THE IRON TRADE REVIEW

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IMPROVEMENT

NOTED IN NEARLY ALL BRANCHES OF THE TRADE.

Increased Production of Steel Making Iron.—More Orders Placed by Railroads.

March business has not come in like a lion, nor is there any danger that it will go out like a lamb. There is a slight but steady improvement in nearly all lines. Many men who have been sitting at their desks during the past four months, doing a good deal of grumbling on account of the few orders received, have discovered that the total transactions for February show a comfortable increase over January, and practically everybody is entertaining a more hopeful feeling. Crop developments will be watched with keen interest, as it is believed that favorable weather will do much to encourage the buying of farm machinery.

Blast Furnace Production

Our monthly blast furnace statistics show a production of 1,233,074 tons in February, as compared with 1,081,813 tons in January. The merchant stacks decreased their production by 44,000 tons, while the output of iron which is used for making steel increased by 200,000 tons. There were 152 furnaces in operation on the last day of February, and 139 on the last day of January.

Good Demand for Wire

The wire business is probably the most prosperous of any branch of the iron trade at the present time. The principal producer has about 80 per cent of its capacity in operation, and during the past few days the demand for its products has increased to an encouraging extent. Another favorable development has been the increase of orders from railroads. Orders for steel rails during the past week amounted to about 15,000 tons, and in the Chicago district there has been liberal buying of track supplies, including 3,000 tons of spikes. In the Cleveland district inquiries for a fair tonnage of standard sections and track supplies are pending from traction interests. A few orders for locomotives have been placed in the east. In structural material, there is improved demand, but some very low prices are being named by fabricators. On one contract taken in Cleveland, only about $22 was allowed for cost of fabricating and erecting, in addition to the cost of the material. Persistent reports of price shading on billets seem to have little foundation except in the fact that some manufacturers who are not usually sellers are naming prices somewhat below the official quotation. Reports of shading on prices of plates by small producers are still heard, but for the most part prices on all finished products are remarkably well maintained.

Sheets Improving

Sheet manufacturers are now operating from 40 to 50 per cent of their capacity, specifications having increased somewhat. An important contract soon to be awarded by the government for harbor improvements at Buffalo will call for 7,000 tons of sheet piling.

Pig Iron Still Dull

Reports of large sales of pig iron have not been confirmed, and the market continues dull and without developments of special importance. Although the recently adopted schedule for deliveries in the central west is being generally maintained, there has been a little shading in some cases, including a sale of malleable at Dayton, O. Southern quotations show much irregularity. In some cities, it is easy to make purchases on a basis of $12.50 Birmingham, but elsewhere $13 seems to be the minimum. Reductions in costs have been effected at some southern plants by interests which show a disposition to make concessions.

Old Material Declines

Following the recent advances in scrap, due to a large extent to speculation, prices are again sagging and the market is dull.

ENCOURAGING SIGN.

Implement Manufacturers Begin Specifying in Steel Bars.

(Special Telegram.)

Pittsburg, March 3.—For the first time since the collapse of business conditions last October, western manufacturers have begun to specify tonnages of steel bars. This development is viewed with much encouragement by producers. Specifications from this source, which came in this week unsolicited, are of such amount as to indicate that the material is intended for new manufacturing work and not for filling in purposes.

The average price on Bessemer iron for February is $17, compared with $18.10 in January at the valley.

In light rails, there has been more activity, the sales totaling several hundred tons.

NEGOTIATIONS PENDING FOR STRUTHERS, O., PLANT.

Negotiations are pending between the Youngstown Sheet & Tube Co., Youngstown, O., and the American Spring Co., Worcester, Mass., for the purchase by the Sheet & Tube Co., of the Struthers, O., plant of the Spring company. It was authoritatively stated yesterday that the deal will likely be completed within a week, and the property turned over to the Sheet & Tube Co., April. 1.

Public calls were resumed by the Indianapolis stock exchange last week, an indication of better financial conditions locally.

THE WEEK IN IRON CENTERS

PITTSBURG.

Trend of Developments is in the Right Direction.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Mar. 3.

Statements of iron and steel conditions in the Pittsburg district from week to week are scarcely more than repetitions, as far as significant developments go, by reason of the peculiar state of business now prevailing. It is difficult at the end of any seven-day period to definitely point to the source or fix the degree of improvement in any single line, as compared with the previous week. Gaged by the broader measure of a month's duration, however, the result is more marked and it is more clearly seen that the entire market structure is directed along the road to recovery, even if the progress be slow and retarded by conflicting incidents.

Taking the month as a whole, February proved to be a better month than January for most companies, in new business booked, tonnage released on suspended contracts and in the extent of mill operations. It is in the monthly totals that the trend of the situation may be more plainly read and though the present conditions are by no means satisfactory to the great bulk of producers, it can be appreciated that the movement is advancing in the direction of former prosperity. With February a month of some improvement, March is begun with a more favorable outlook.

In the absence of any true tests of its strength, the pig iron situation presents evidences of firmness and the indications point to the price arrangement among the furnacemen as being carefully regarded, in comparison to other recent understandings of similar purpose. Production continues slowly to decline, the summary of the valleys now showing but four furnaces out of 19 in blast, two upon foundry, one upon low phosphorus and one upon Bessemer iron.

In finished lines, the situation continues as it has been, spasmodic. Different products show varying strength or weakness with the passing of the weeks. The past week has developed more activity in wire products and merchant pipe, among some interests with a shade of an improvement in sheets.

Reports of price shading are many, but the one to which, probably, the most attention has been given recently, that of billets, does not appear to have been more than limited in its effect, in that the supply available is believed to be restricted to that in the hands of middlemen or to the excess over manufacturing needs held by small mills. Regular sellers of billets declare they are taking business at full market figures.

In plant operations the past week shows little change, the percentage of active operations in this district continuing practically 50 per cent.

Pig Iron.—Pig iron prices are being fairly well maintained in accordance with the schedule recently adoptd by furnacemen to hold upon a delivered basis of $17 plus switching charges. While in the absence of any large tonnages being sought by melters the present situation fails to thoroughly test the market's strength, the fact remains that there is very little positive evidence of radical cutting, despite frequent rumors to the contrary. A valley furnace price of $16, making the Pittsburg delivered price for No. 2, $16.90 or 10 cents under the schedule, is being done quite regularly on small lots, but this appears to be the limit of the shading, as efforts of brokers to have a $15.90 furnace price accepted have generally failed. Reports are persistent of $15.50 valley furnace having been done on round tonnages of foundry iron, but where investigation has developed results, it has been found that some special consideration was attached to these transactions. Along this line, we note the sale of several lots, aggregating 1,000 tons of foundry iron, running high in sulphur at $15.50 valley furnace and 100 tons at $15.50 furnace, approaching No. 3 iron in silicon and disposed of by an interest which had originally taken it on an exchange deal. The inquiry for foundry iron is only moderate, melters continuing to order only for work in sight. Some parties outside the iron industry have asked for quotations on large tonnages, apparently for speculative purposes, but these are not regarded as bona fide market inquiries. A few sales of malleable are reported on the $17 delivered basis. There is but little interest in Bessemer, a sale of 200 tons of chill cast iron having been made in the week at $18 valley furnace. Shenango No. 3 furnace, which had been on Bessemer, has been banked. Sand cast Bessemer is quoted at $17 valley furnace or $17.90 delivered, Pittsburg. The basic market continues at $16 valley furnace. There is some inquiry in the market by western and southern steel makers. We note the sale of 300 tons of northern gray forge at $15 valley furnace or $15.90 Pittsburg. Reports from the Mahoning and Shenango valleys show but four merchant furnaces out of 19 in blast. These are Stewart on low phosphorus, Girard on foundry, one Andrews and Hitchcock on foundry and Tod, of Youngstown Steel Co., on Bessemer. Midland furnace at Midland, Pa., not in the valleys, which is on basic, is still in blast, but is expected to go out soon. We continue to quote the following prices on northern iron for either prompt or second quarter deliveries:

Bessemer, valley	$17.00 to 18.00
Bessemer, Pittsburg	17.90 to 18.90
No. 1 foundry, Pittsburg	17.40 to 18.40
No. 2 foundry, Pittsburg	16.90 to 17.00
Gray forge, Pittsburg	15.90 to 16.15
Basic, valley	16.00 to 17.00
Basic, Pittsburg	16.90 to 17.90

Ferro-Manganese. — There is little business being transacted, but the tendency is toward lower prices. We note a recent sale going to a southwestern steel maker on a basis of about $46 Pittsburg. The Pittsburg market is nominally $46.50 and we quote foreign ferro-manganese, 80 per cent at from $46 to $47 Pittsburg on prompt shipment from European ports.

Imported 50 per cent ferro-silicon is quoted $88 Pittsburg on forward deliveries; domestic 12 per cent, $30; 11 per cent, $29; 10 per cent, $28. The lower grades of imported ferro-silicon are quoted 50 cents higher. These quotations are applicable to Pittsburg territory.

Plates.—Though the schedules of the leading interest call for practically full operations at local mills for the first two weeks in March, the prospects for continued activity on such a scale are not clearly defined. Steel car manufacturers are not taking much new business and are expected to soon be obliged to shut down, unless there is more buying by the railroads. There is some plate consumption in vessel repair work in lake yards, but the outlook for new construction in the ensuing season is not encouraging. New plate business is light. Fewer reports of small independent mills cutting upon light plates are heard. Prices are unchanged and we quote:

Tank plate, ¼-inch thick, 6¼ to 100 inch, 1.70c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c;

A. B. M. A. and ordinary fire-box steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive fire-box steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ¼-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—A slight improvement is noted in sheets during the past week, but mill operations are unchanged, the American Sheet & Tin Plate Co., as well as the independents, working upon a basis of from 40 to 50 per cent. The Youngstown Sheet & Tube Co. started its plant full this week after a shut down of several weeks, caused in part by an accident to the engine in the sheet bar mill. Specifications show some gain, but the immediate needs of the buyer still limit the size of his order. We quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.60c; No. 30, 2.70c. Galvanized: Nos. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 3.95c. Blue annealed; No. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Tin Plate.—Trade in tin plate shows no change, the volume of business continuing considerable more than in sheets or most other finished lines. The principal producer during the week shut down some mills, but started operations in others, making the active capacity practically the same. Independent palnts are enjoying similar conditions. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—Rail business of the past week has been light, the only sale of standard sections going to a Kansas interurban line and amounting to 680 tons. In light rails, there has been more activity, the scattering sales totaling upwards of 1,000 tons including one of 500 tons to a lumber company. Rerollers continue to shade the price schedule of light rails rolled from billets. On present specifications we quote as follows on Bessemer rails:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $36; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.75 to $1.80 Pittsburg; hand spikes, $1.95 to $2.05 Pittsburg.

Steel.—Much attention has been attracted to the semi-finished steel market by the current reports of shading being done on the standard price of billets and investigation by the leading producers has led to the conclusion that this practice has been of limited extent, being confined largely to middlemen. Rumors of concessions being made in this respect are not so general this week. Business offered regular sellers, at prices below the market, has been refused and it is stated that orders are being booked at the full quotation. Several prospective buyers, however, who have been sounding the market, are withholding the placing of their contracts for the present. A portion of the inquiry by a local consumer for 2,000 tons, part of which called for high carbon, high manganese steel and mentioned last week, has been closed. The special analysis tonnage of the inquiry was taken at the official $28 Pittsburg price with full extra. Some of the regular anlaysis steel was also awarded at the usual market quotation. The billets are for March delivery. The readjustment of prices on sheet and tin bars for Pittsburg, valley, and Wheeling territory, which became effective March 1, has produced no special features in this market, but the indications are probable for considerable business being placed soon. We continue to quote Bessemer and open-hearth billets at $28, Pittsburg, and $29.50 on sheet and tin bars for Pittsburg, valley and Wheeling territories and $29 Pittsburg for delivery to other points.

Hoops and Bands.—The hoop and band market has gained no strength and specifications and new business remain of moderate volume. We continue to quote the following official prices:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c; base half extras as per standard steel.

Merchant Bars. — The tonnage of steel bars under contract is being diminished very slowly through specifications, the drawing upon this supply by users being in direct proportion to the actual requirements of the work being booked by them. Specifications on bar iron contracted before the recent advance from $1.40 to $1.50 Pittsburg show improvement, and March begins with good prospects for an increase of tonnage, in this respect, over February. Cutting by 10 cents of the established price on bar iron is being done by some mills, which usually act independently of any price arrangements. This is being done on small tonnages. Shading of special bar sections for particular trades is reported, but this is not of extensive proportions. There is considerable irregularity in the price of steel shafting. We continue to quote:

Common iron bars, 1.40c to 1.50c Pittsburg in carload lots and over; 1.50c in less than calroads; 1.47c to 1.50c base Pittsburg plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.60c net; plow and cultivator, 1.60c net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 56 per cent in carloads, 48 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.80c base. Iron finished tire under 1½ by 1½ inches, 1.75c; iron finished tire, 1½ by ½ inches and over, 1.60c base. All tire subject to ½ extra on the steel card.

Structural Material.—With material and labor lower, the present time is regarded as opportune for the carrying out of contemplated building improvements and prospective investors in favorable financial positions are manifesting more interest in structural lines. This sentiment, however, has resulted in little structural business being placed as yet and the immediate prospects are not regarded as particularly promising. Some structural mills are quite active at present by reason of recent releases on contracts, but they are not assured of being able to maintain this capacity beyond a few weeks' time. In the fabricating line, business does not show a great deal of life and low prices are still in vogue.

Bids for the erection of the Pittsburg & Lake Erie railroad bridge at Beaver will be taken toward the end of March. Improvements at the plants of the Union City Iron Works, Erie, Pa., and the National Transit Co., Oil City, Pa., will require some tonnage. We continue to quote:

Beams and channels, 15-inch and under, 1.70c; over 15 inches, 1.85c; zees, 1.70c; tees, 1.75c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.80c base.

Merchant Pipe.—The spring trade in pipe is opening somewhat later than ordinarily, and business conditions, as a whole, are somewhat quiet. Some independent interests, however, report having booked considerable tonnage in the past several weeks and while they are now operating upon a 35 per cent basis, expect to increase this to 60 per cent in two weeks. The market is somewhat stronger in position, in that it is stated that wrought iron pipe makers are showing less inclination to cut prices and are maintaining the usual discounts. We continue to quote the following official discounts of the leading interest to consumers in large lots, with an additional one point and five off to jobbers:

	Black.	Galv.
⅜ and ¼ inch	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
⅜ to ⅜ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inches	54	43

Boiler Tubes. — Considerable business has been taken by independent interests in the past week at full card prices and no shading of quotations is reported to have been encountered in obtaining these orders. The outlook is better for more active operations in the near future. We quote the following discounts:

	Iron.	Steel.
1 to 1½ inch	42	47
1¾ to 2¼ inch	42	59
2½ inch	47	61
2¾ to 5 inch	52	65
6 to 13 inch	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.

2¾ inches and larger, over 22 feet, 10 per cent net extra.

Wire Products. — The past week has brought somewhat of a spurt in barb wire, nails and plain wire trade to some mills, the situation in this particular being the best in months. Another encouraging development is the number of urgent requests being received from jobbers, for hurrying forward of shipments. A steady volume of business in fencing is also being booked, for shipment to farming communities. We continue to quote:

Wire nails, jobbers' carload lots, $2.05; retailer's carload lots, $2.10; less than carloads, $2.15; painted barb wire, $2.20 for jobbers in carloads; retailers in carloads, $2.25; and less than carload, $2.35; with 30c for galvanizing; plain wire, 1.90c for jobbers, and 1.95c by carload.

Rods.—We quote nominally, Bessemer rods at $35, Pittsburg and open-hearth at $36 Pittsburg. There is no activity.

Coke.—There is more inquiry for standard grade coke although actual sales have not been in accordance. The market is no stronger and in furnace coke is a trifle weaker, some having been disposed of at $1.70 ovens. There is a further curtailment of production, among certain interests, but some independents are also puting more ovens in blast. The Jamison Coal & Coke Co. begins March with 1,100 ovens in operation and expects that period to show the highest output in the history of the company. We quote spot furnace coke at $1.70 to $1.80 at ovens and standard foundry coke at $2.25 to $2.40 ovens.

Old Material. — Interest in scrap material continues on the decline although some dealers are still prosecuting their buying activity. Some dealers are also offering the stock, recently accumulated in yards, but the mills in this district are not interested and the result is that the life of the market at present is being maintained among the dealers. Little mill scrap is being offered, the greater portion of the supply coming from the railroads. We quote the following, nominal prices, gross tons, delivered in the Pittsburg district:

Heavy melting scrap, $13.25 to $13.75; rerolling rails, $14.25 to $14.50; bundle sheet scrap, $9.50 to $10; iron axles, $18.50 to $19.50; old iron rails, $15 to $16; No. 1 wrought scrap, $13.50 to $14; old car wheels, $15.50 to $16; low phosphorus scrap, $17 to $17.50; machine shop turnings, $8.50 to $9; cast borings, $7.75 to $8.25; No. 1 cast scrap, $14.75 to $15.25.

CHICAGO.

Increased Buying by Railroads—Pig Iron Very Dull.

Office of THE IRON TRADE REVIEW,
1362 Monadnock Block, Mar. 3.

The most satisfactory part of the week's market activity had to do with railroad purchases. The importance of this buying is largely by virtue of contrast. The complete allotment of the 60,000 tons of rails ordered by the Great Northern railway is announced; the Santa Fe road undertook to handle 6,000 tons more on its rail contract with the Corporation; 3,000 tons of spikes were sold and an inquiry for 13,000 kegs was received. Other equipment in the way of bolts and rail joints and special track work for street railways was ordered and a sale of 1,000 tons of light rails was made. Inquiry for steel bars was likewise important. The structural contracts let in the west were small with two exceptions at Madison, Wis., and St. Louis, the work going to independent interests. The scrap iron market broke sharply on the opening day of the week and prices are off very generally. The interest in pig iron is monotonously dull and the enforced apathy grows wearisome.

Freight Rates. — The following freight rates are in force on iron and steel products delivered at Chicago: On pig iron, per ton, from the valley, $2.40; from Pittsburg, $2.80; from Birmingham, $4.35; from Michigan points for charcoal iron, $1.50; from Virginia, $3.20. On billets and rods, per ton, from Pittsburg, $3. On iron and steel, merchant bars, structural steel, plates, rails and wire products, 18 cents per 100 pounds, for carload lots and 21 cents for less than carload lots. On coke, from Connellsville, $2.65.

Pig Iron. — Scarcely any week has been more quiet than the one under review. One sale of 300 tons of southern No. 2 was reported sold at $13 and another 300 tons of southern silvery was bought by the Western Foundry Co. though the order was divided between two interests. There is no foundation for the reported purchase of 25,000 tons of southern iron by the International Harvester Co. This company did not acquire a single ton by outright purchase, and, if any iron was taken, the amount did not begin to approach the tonnage reported. Prices on southern iron quoted in other sections at from $12 to $13 seem to have no counterpart here. No transactions involving standard No. 2 can be found where anything less than $13 Birmingham is the basis. More than this, it is claimed that certain furnaces have become resigned to selling no iron and have returned to the $13.50 price. The complete absence of tonnage is responsible for this and, reasoning in the opposite direction, one might easily predict the result of any desirable tonnage appearing.

Lake Superior Charcoal	$21.50 to 22.00
Northern Foundry No. 1	18.00 to 18.50
Northern Foundry No. 2	17.50 to 18.00
Northern Foundry No. 3	17.00 to 17.50
Southern Foundry No. 1	17.85 to 18.35
Southern Foundry No. 2	17.35
Southern Foundry No. 3	16.85 to 17.35
Southern Foundry No. 4	16.35 to 16.85
Southern No. 1 Soft	17.85 to 18.35
Southern No. 2 Soft	17.35 to 17.85
Southern Gray Forge	15.35 to 15.85
Southern Mottled	15.10 to 15.60
Southern Silveries, 4 per cent Silicon	18.85 to 19.35
Southern Silveries, 5 per cent Silicon	19.35 to 19.85
Southern Silveries, 6 per cent Silicon	20.35 to 20.85
Jackson Co. Silveries, 6 per cent	21.90 to 22.40
Jackson Co. Silveries, 8 per cent	23.90 to 24.40
Jackson Co. Silveries, 10 per cent	25.90 to 26.40
Malleable Bessemer	18.00 to 18.50
Standard Bessemer	19.40 to 19.90
Alabama Basic	17.35 to 17.85

Coke.—The foundry coke situation

is more active than the demand for foundry iron. Foundries are taking coke shipments at a slightly increased rate, which represents only the working off of stocks of iron on hand. Some instances may be pointed out where foundries in this territory have increased their coke consumption up to 75 per cent of normal. Prices remain unchanged and we quote Connellsville foundry coke at $2.40 at the ovens and furnace coke at $1.75.

Billets and Rods.—Occasional orders for 50 and 60-ton lots continue to be the rule. There is no appreciable change in the situation. Wire rods are unimportant from the standpoint of sales. We quote for Chicago delivery, rolling billets, $31 and forging billets, $33. We quote f. o. b. Pittsburg Bessemer wire rods, $35, open-hearth rods, $36 and chain rods, $37.

Merchant Bars.—A very slight improvement is reported from the bar iron mills and it is believed that there is now practically no cutting of the 1.50c price. A notably better inquiry for steel bars prevailed during the past week, but its permanency is uncertain. The general demand for iron in various shapes was more active than in the preceding week, but there have been no developments to induce jobbers to increase their stocks. Prices remain without change and we quote for Chicago delivery in carload lots, as follows:

Bar iron, 1.65c to 1.85c; soft steel bars and bands, 1.78c, half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel, 1.98c; iron finish, up to 1½ x ½ inch, 1.93c base tin card; iron finish 1½ to 1½ inch and larger, 1.78c base, steel card; channel for solid rubber tire, ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe, 1.83c; concave and convex sleigh shoe, 1.93c; cutter shoe, 2.36⅛c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 54 per cent off the list for carload lots, and 48 per cent off for less than carload lots. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.10c, full extras; soft steel bars, $2 per 100 pounds base, plus half extras; soft steel hoops, 2.40c; full extras.

Plates.—The plate situation continues very quiet and without other changes. We quote:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.88c to 1.91c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2.10c to 2.20c; from 72 to 96 inches wide, 2.20c to 2.30c; 3/16-inch up to and including 60 inches wide, 2.20c to 2.25c; 72 inches wide, 2.45c to 2.55c; No. 8 up to 60 inches wide, 2.20c to 2.25c. Flange and head quality, 25c extra.

Sheets.—Sheets are moving from store in fair volume, but jobbers are not ordering from mill more rapidly than is required to keep their stocks balanced. For mill prices see Pittsburg report. We quote for Chicago delivery from store on carload lots and less as follows:

No. 10, 2.20c to 2.25c; No. 12, 2.25c to 2.30c; No. 14, 2.30c to 2.35c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, Nos. 10 to 16, 3.05c to 3.15c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00; No. 30, 4.40c to 4.50c.

Structural Steel.—For the country at large, the tonnage of structurals ordered during the past week was very encouraging. The leading fabricator took orders sufficient so that, if maintained at that rate per week throughout the year, its total capacity of 750,000 tons would be taken care of. Little of this business was taken in the west, however, the local office of the American Bridge Co. taking about 700 tons. Inquiries for an aggregate of 500 tons of local business is pending. The addition to the state capitol at Madison, Wis., went to the Modern Steel Structural Co. of Waukesha for $51,932. The Manufacturers' Railway Co. viaduct at St. Louis was taken by the Cambria Steel Co. for $53,700, covering about 900 tons. Inquiries for 500 tons from San Francisco have been received. We quote:

Beams and channels, 3 to 15 inches inclusive, 1.88c to 1.91c delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles, over 6 inches, $2.15 per 100 pounds base; beams, 3 to 15 inches inclusive, $2.05 per 100 pounds base; channels, 3 inches and larger, $2.05 per 100 pounds base.. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—The complete apportionment of the 60,000 tons of rails ordered by the Great Northern railroad for immediate shipment in the next three months has been announced. As reported last week, 45,000 tons was divided among the Steel Corporation, Lackawanna Steel Co., and Pennsylvania Steel Co., as follows: 20,000 tons, 15,000 tons and 10,000 tons respectively; of the remaining 15,000 tons, 10,000 tons went to the Cambria Steel Co. and 5,000 tons to the Bethlehem Steel Co. An inquiry has also been received, it is understood from the same road, for 13,000 kegs of spikes. Further specifications for 6,000 tons of rails on the contract with the Illinois Steel Co. were received from the Atchison, Topeka & Santa Fe road. It is reported, however, that no new rails are actually being laid by this road despite the fact that it is receiving a comparatively large tonnage from mills with which it has standing contracts. Three orders of good size for special trackwork for street railways in Milwaukee, Omaha and Idaho were taken by the Pennsylvania Steel Co., and orders for 1,000 tons of light rails were received by the principle producer. One western road bought during the week, probably for its year's requirements, 3,000 tons of spikes, and an order for 1,300 kegs of bolts was placed. The Corporation also took a contract for 1,000 tons of rail joints. As compared with weeks recently experienced, the one under review was productive of the most business in four months. We quote:

Standard rails, $28 f. o. b. mill, full freight to destination; light rails, 25-pound to 45-pound, $28; 20-pound, $29; 16-pound, $30; 12-pound, $31. Track supplies, f. o. b. Joliet, angle bars, 1.65c; spikes, 1.85c to 1.95c; track bolts, with square nuts, 2.35c to 2.45c; with hexagon nuts, 2.50c to 2.60c. Small railroad and square boat spikes, 2c base, f. o. b. Pittsburg.

Merchant Pipe and Boiler Tubes.—There has been no break on the uniform quiet with which these materials are surrounded. Jobbers are carrying very small stocks and construction work in most directions is almost at a minimum. Any increase in the need for pipe or tubes would be immediately felt by the mills as jobbers would be compelled to buy in order to supply even a moderate demand.

We quote mill discounts, Chicago delivery, carload lots, as below. On

steel pipe jobbers are allowed a concession of one point and 5 per cent additional from the schedule in force:

	—Steel— Black.	Galv.
¾ to 6 inches, inclusive....	71.2	61.2

BOILER TUBES.

	Steel.	Iron.	Seamless.
2¼ to 5 ins., inclusive..	63.2	50.2	49.2

Mill quotations on iron pipe are five points higher than the foregoing prices.

We have revised our prices from store, as below. A concession of one-half to one point from these prices is allowed by Chicago jobbers on carload orders shipped from local stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	64	48
⅜ inch	66	52
½ inch	68	56
¾ to 6 inches	72.5	62
7 to 12 inches.....	68	53

Store prices for wrought iron pipe, carload lots, from Chicago stocks, are as follows: One-eighth to ¼-inch, 59; ⅜-inch, 61; ½-inch, 63; ¾-inch to 6 inches, 68; 7 inches to 12 inches, 65. Boiler tubes from store are unchanged as follows:

	Steel.	Iron.	Seamless.
1 to 1½ inches.....	35	35	35
1¾ to 2¼ inches.....	50	35	35
2½ inches	52½	35	35
2¾ to 5 inches.....	60	47½	47½
6 inches and larger....	50	35	..

Cast Iron Pipe.—In the next two weeks are scheduled nine or ten lettings of cast iron pipe for small tonnages, the aggregate of which will amount to about 4,000 tons. The largest of these contracts are for Waukesha, Wis., and Grand Rapids, Mich, each being for 700 tons. The others range from 150 to 300 tons. The Elyria contract has not been let, but the low bidder is the Massillon Iron & Steel Co. Apparently the bidding on municipal work recently has followed no law, for on two municipal contracts let where the freight rates were identical there was a wide difference between the low bids. There is less certainty in the price position of pipe this week. We continue to quote 4-inch pipe, $30; 6 to 12-inch, $29; larger sizes, $28; gas pipe, $1 a ton higher.

Wire Products.—The month of February shows a slight increase over January in the sales of wire products. The principle producer is operating about 75 per cent of its mill capacity and estimates that about the same percentage of its normal business is coming in. New orders are being received in satisfactory volume and it is anticipated that April will show the customary increase. Farmers' tools and supplies are being bought in almost the usual quantity. Prices are firmly established and we quote to jobbers, Chicago delivery, as follows:

Wire nails, $2.23; painted barb wire, $2.38; galvanized barb wire, $2.68; smooth annealed wire, $2.08; smooth galvanized wire, $2.38; polished staples, $2.23; galvanized staples, $2.63. Carload lots to retailers, 5 cents higher; less than carload lots, 15 cents higher.

Old Material.—From the insecure position of strength in which the market for scrap was lodged up to the end of last week, it has sagged with marked weakness. The small list reported by the Burlington followed by a list of only 1,000 tons from the Chicago & Northwestern and 2,000 tons from the Illinois Central had led to a hope on the part of those contributing to the support of the market that with the amount of scrap available very small and with a prospect of unfavorable weather, the position of the market might be maintained. At the begining of this week, however, the Great Northern is offering 7,500 tons and the Erie has a list. Coupled with this is the reported offering of scrap from local yards at prices sometimes more than $1 below the market of a week ago. The effect of the sudden change is indicated in our prices which we have revised and quote, gross tons in the first paragraph, as follows:

Old car wheels.....	$15.75 to 16.25
Old iron rails.....	15.50 to 16.00
Re-rolling rails (3 ft. and over).	12.25 to 12.75
Old steel rails (3 ft. and under)	12.25 to 12.75
Light section relayers, 45 lbs. and under, subject to inspection....	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards.....	12.00 to 12.50
Heavy melting steel.....	11.50 to 12.00

We quote, net tons, as follows:

No. 1 R. R. wrought.....	$11.50 to 12.00
No. 2 R. R. wrought.....	10.50 to 11.00
Knuckles, couplers and springs..	10.75 to 11.25
Shafting	13.50 to 14.00
Iron car axles.....	16.75 to 17.25
Steel car axles.....	15.50 to 16.00
Dealers' forge No. 1.....	9.50 to 10.00
Pipes and flues.....	8.50 to 9.00
No. 1 cast, 150 lbs. and less...	12.25 to 12.75
No. 1 mill.....	8.00 to 8.50
Mixed busheling (Nos. 1 and 2)	7.75 to 8.25
Country sheet	5.25 to 5.75
No. 1 boiler cut.....	7.00 to 7.50
Boiler punchings	10.00 to 10.50
Cast borings	5.00 to 5.50
Mixed borings, etc.....	5.00 to 5.50
Machine shop turnings.....	6.75 to 7.25
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Stove plate and light cast scrap.	10.50 to 11.00
Old iron splice bars.....	14.50 to 15.00

Theodore Geissmann & Co., Commercial National Bank building, Chicago, has just placed D. S. Hunter in charge of their Minneapolis office and he will look after the company's interests in the northwest territory.

CLEVELAND.

Low Bids on Market House—Large Contract for Sheet Piling Pending.

Office of THE IRON TRADE REVIEW,
Browning Bldg., Mar. 3.

Iron Ore.—The movement of ore from docks to furnaces continues at a very slow rate. At the mines, most of the companies are not working 50 per cent of the force they worked last winter, and the outlook for the coming summer is not bright. The greatest curtailment promises to be at the underground properties of the independent operators. The Steel Corporation's stripping operations are being carried on as actively as during last fall. As a general proposition, it would be more advisable to shut down some properties and work others to their capacity rather than to work all under reduced scale. In 1894, the year following the panic of 1893, ore shipments declined about 33 1/3 per cent, and the prevailing opinion is that the shipments for 1908 will show a similar decline, so that the shipment would be about 28,000,000 tons. On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer and 51.50 per cent on old range and Mesabi non-Bessemer we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20, and Mesabi non-Bessemer, $4.

Pig Iron.—Extreme dullness prevails in the pig iron market. Although the recently agreed upon schedule seems to be pretty well adhered to, it is understood that one sale of malleable was made by an Ohio interest at a lower price. Inquiries for basic from the St. Louis district have not resulted in any business coming to sellers in this section. We quote Cleveland delivery, charcoal iron being based on water freight rates, as follows:

Bessemer	$17.90 to 18.90
No. 1 foundry	17.85
No. 2 foundry	17.35
No. 3 foundry	16.85
No. 2 southern	16.85 to 17.35
Gray forge	16.00 to 16.85
Lake Superior charcoal	22.00 to 23.00

Coke.—The market is quiet, practically nothing being done. We quote spot foundry coke $2.30 to $2.50, and spot furnace coke at $1.60 to $1.70.

Finished Material.—The most important business in sight at lower lake ports is the calling for bids by the United States government for the improvement of Black Rock lock at Buffalo, which will require about 7,000 tons of sheet piling. The contract will be awarded March 14. A striking example of the low prices at which new construction work is being taken is furnished by the bids for the West Side

market house in Cleveland. The lowest bidder was the National Iron & Wire Co., of Cleveland, which bid $40,775, the next lowest bidder being only $25 higher, and the highest bid being for $53,500. At the bid of the National Iron & Wire Co. only about $58.25 per ton would be paid by the city. As the material costs $36 delivered in Cleveland, the allowance for fabricating and erecting would be only $22.25. On the viaduct contract recently awarded, bids ranged from $60 to $82 per ton. A considerable part of the material for the new market house will come from the stock of the National Iron & Wire Co., but 200 or 300 tons will probably be ordered from the mills. Some inquiries for rails and track supplies from traction interests are pending. Jobbers report that their business from store has improved somewhat during February as compared with the preceding month.

Old Material.—The market was the dullest the past week that it has been in months. Little movement of material was apparent and the local mills were scarcely a factor in the market at all. The boom, or rather price flurry that appeared in the eastern markets, seems to have flattened out before it had fairly reached this city. This, it is believed, was brought about by the liberal offerings of three of the largest railroads. They succeeded in getting fairly good prices for the general description of material offered, but since then the market has remained quiet, apparently awaiting the taking by consumers of this quantity of material purchased by dealers. We quote f. o. b. Cleveland as follows, almost altogether nominal:

Old iron rails	16.25 to 17.25
Old steel rails (re-rolling)	13.50 to 14.00
Old steel rails (under 6 feet)	12.25 to 13.25
Old car wheels	16.00 to 16.50
Old steel boiler plate	9.25 to 10.25
Steel axles	14.50 to 15.00
Malleable iron (railroad)	12.25 to 13.25
Malleable iron (agricultural)	10.25 to 11.25
Heavy steel	11.25 to 12.25
Country mixed steel	11.00 to 12.00
Low phosphorus	14.75 to 15.50

We quote, net tons, as follows:

No. 1 R. R. Wrought	11.75 to 12.75
No. 1 busheling	11.00 to 11.50
No. 1 machine cast	12.50 to 13.00
Iron axles	16.25 to 17.25
Axle turnings	7.25 to 8.25
Machine shop turnings	7.00 to 7.50
Grate bars	9.25 to 10.25
Pipes and flues	10.00 to 11.00
Tank iron	8.25 to 9.25
Hoop and band iron	5.25 to 6.25
Sheet iron	4.25 to 5.25
Wrought drillings	7.00 to 7.50
Stove plate	10.25 to 11.25
Cast borings	5.00 to 6.00

An ordinance was introduced in the council of Cincinnati, Mar. 2, authorizing the board of public service to contract for furnishing the city waterworks with pipes and special castings for 1908 to the amount of $60,000.

CINCINNATI.

Inquiries More Numerous—Buyers Contending For $12 Price.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Mar. 3.

Pig Iron.—But little change is noticeable in the pig iron market this week. Inquiries are perhaps slightly more numerous, but are confined to small tonnages. A few sales of fair sized lots have been made, among which were 2,000 tons of gray forge and No. 2 foundry for Detroit, 1,000 tons of No. 4 foundry on the basis of $11 Birmingham, and a good tonnage of northern malleable at $16.65 delivered at Dayton, O. Southern iron is still quoted quite generally at $12.50 Birmingham for No. 2 foundry. It is intimated that this quotation has been quietly shaded, but open prices below $12.50 are not being circulated. Buyers are contending for a $12 price and a number of firm offers are in the hands of furnace agents on this basis. Northern iron is held to considerable extent on the agreed basis, but in this territory quotations of $16 Ironton have been found and even less than this is believed to have been done. The maximum price now asked for southern iron is $13 Birmingham and the leading producers are quoting this figure. Jobbing foundry requirements are still light, but soil pipe makers and stove manufacturers are reporting some improvement in the demand for their product. The call for coke on contracts is better than a month ago indicating slowly improving activity in the melt of iron. Stocks of iron in furnace yards in the south are more centralized now and most of the odds and ends have been disposed of, which has a tendency to give the market more regularity. It is said that some furnaces are in a more receptive mood than they have been and are inclined to invite firm offers at close to the market. To this extent an easier feeling prevails. The reduction of furnace costs in the south which has taken place recently is believed in some quarters to offer inducements to the most advantageously located furnaces to blow in and some increase in southern production may be brought about through this feature in the near future. Low grade iron is dull and gray forge is quoted at $10.50 Birmingham. Ohio Silvery 8 per cent silicon is obtainable at $19 at furnace. We quote for March and second quarter delivery, delivered Cincinnati, based on freight rates of $1.20 from Ironton and $3.25 from Birmingham as follows:

	PER TON
Southern foundry No. 1	$16.25 to 16.75
Southern foundry No. 2	15.75 to 16.25
Southern foundry No. 3	15.25 to 15.75
Southern foundry No. 4	14.75 to 15.25
Southern No. 1 soft	16.25 to 16.75
Southern No. 2 soft	15.75 to 16.25
Southern gray forge	13.75 to 14.25
Northern No. 1 foundry	17.70 to 18.70
Northern No. 2 foundry	17.20 to 18.20
Northern No. 3 foundry	16.70 to 17.70
Northern 8 per cent silicon	20.70 to 21.20

Finished Material.—Mill orders continue moderate. Specifications on contracts have been limited. Store business rules fair. Less than car lot orders are filled here at the following prices:

Bar iron, 1.75c; steel bars, 1.85c, one-half extras. In some instances, retailers are still asking 2.10c, full extras, from store on small lots for both iron and steel. Angles, 3 x 3 and over, 2.15c to 2.25c; beams and channels, 15 inches and under, 2.15c; small angles and architectural channels, 2c base; plates ¼-inch and heavier, 2c; 3/16 inch, 2.10c; No. 8, 2.15c; sheets (blue annealed) No. 10, 2.25c; No. 12, 2.30c; No. 14, 2.35c; No. 16, 2.45c; box annealed sheets, Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and 26, 2.80c; No. 27, 2.85c; No. 28, 2.95c; boiler tubes, 62 per cent off base; turnbuckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting, 50 per cent off list; steel tire, 2.05c base.

Coke.—There has been a slight improvement in requisitions on contracts for foundry coke. Furnace coke is quiet. Sales are mostly for prompt delivery. Prices show practically no change. Quotations in the leading coke producing districts are as follows:

Wise county furnace coke	$1.75 to 2.00
Wise county foundry coke	2.25 to 2.50
Pocahontas furnace coke, prompt shipment	1.65 to 1.90
Pocahontas foundry coke	2.25 to 2.40
Connellsville furnace coke, prompt shipment	1.75 to 2.00
Connellsville foundry coke	2.25 to 2.50

Old Material.—Dealers are holding well to schedule prices and supporting the market by purchases of offerings. Melters are taking scrap moderately, but the market holds steady at quotations. We quote dealers' prices here as follows:

Old No. 1 R. R. wrought, net tons	$12.00 to 12.50
Cast machine and fdy., net tons	12.50 to 13.50
Old iron rails, gross tons	16.50 to 17.50
Old steel rails (re-rolling) gross tons	12.50 to 13.50
Old short lengths, gross tons	12.50 to 13.50
Old iron axles, net tons	16.50 to 17.50
Heavy melting scrap, gross tons	13.00 to 14.00
Stove plate, net tons	10.50 to 11.50
Wrought turnings	5.50 to 6.50
Cast borings, net tons	4.50 to 5.50
Car wheels, gross tons	16.50 to 17.50

A contract to repair the Virginia avenue viaduct, Indianapolis, has been awarded to the Indiana Bridge Co., of Muncie. The successful bid was $5,900. Work is to start at once.

PHILADELPHIA.

Increased Buying by Railroads Is an Encouraging Sign.

Mar. 3.

Pig Iron.—It is like repeating a thrice-told tale to go over the operations of the past week. Sales have not been numerous and have been mostly to the pipe founders, who have also purchased some southern iron. Such orders as come from foundrymen are generally small and for prompt shipment, as there is no disposition to make commitments beyond the first quarter. Prices are firmly held, and while there is some talk of cutting by outside interests, this seems to have made no impression on those who have agreed to maintain the present figures. Reports of greater purchasing activity by the railroads, which seem to hold the key to the situation, encourages the hope that better days are coming before long, and furnace men are seeking to hasten their advent by a vigorous curtailment of production. In some cases, this has been so effective that purchases can only be filled by drawing on accumulated stocks, which are disappearing under the process. Some improvement is reported in inquiries, but new business is very light. Prices show no change, as follows:

No. 1X foundry	$18.75 to 19.25
No. 2X foundry	18.25 to 18.50
No. 2 plain	17.75 to 18.00
Standard gray forge	16.50 to 16.75
Basic	17.25 to 17.50
Low phosphorus	23.50 to 24.00

Finished Material.—If the Baldwin Locomotive Works, which in prosperous times employs over 20,000 men and turn out seven or eight engines a day, may be taken as a barometer of the industrial situation, matters have begun to mend. Some small orders for locomotives have recently been received, and the plant is assured of activity on a reduced basis for some weeks. Reports from neighboring mills show some slight improvement in the demand for plates and structural material, and the situation, while by no means rosy, is undoubtedly better than it was a few weeks ago. There is no disposition to cut prices, as buyers themselves say that such a course would be no inducement to buy and would only demoralize the market. Prices may therefore be quoted as unchanged, as follows: Beams, channels and angles, as according to specifications, 1.85c to 2c; refined iron bars, 1.65c; steel bars, 1.75c to 1.85c; plates, 1.85c to 1.90c.

Old Material.—The speculative activity that put up prices a fortnight ago has disappeared, and scrap seems on the down grade again. The mills are buying very little, and the big dealers have discovered that the little fellows have got a good deal more stock piled up in their yards than they had supposed. The discovery has not been favorable to keeping up quotations. Prices may be quoted as follows:

Old steel rails	$15.00 to 15.50
No. 1 steel scrap	14.00 to 14.50
Old steel axles	19.00 to 19.50
Old iron axles	22.00 to 23.00
Old iron rails	18.00 to 18.50
Old car wheels	17.00 to 17.50
Choice scrap R. R. No. 1 wrought	15.00 to 15.50
No. 1 yard scrap	13.50 to 14.00
Machinery scrap	15.50 to 16.00
Low Phosphorus scrap	18.00 to 18.50
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire scrap	11.00 to 11.50
No. 2 forge fire scrap, ordinary	9.00 to 9.50
Wrought turnings	10.00 to 10.50
Axle turnings, heavy	11.00 to 11.50
Cast borings	8.50 to 9.00
Stove plates	13.00 to 13.50

ST. LOUIS.

Inquiries For 15,000 Tons of Basic Pig Iron Pending.

March 2.

Pig Iron.—There is not much change in the market as regards buying. Rumors of lower prices on foundry iron are frequently heard. Some buyers assert that they can cover their wants for second quarter delivery at $12 for No. 2, Birmingham basis. Many foundries are on the verge of making contracts, believing that prices have reached the bottom. As it now stands, dealers are buying from hand to mouth, each one seeming to be waiting for another to take the initiative. There is one inquiry out for 10,000 tons of basic iron, which probably will be placed within the next ten days. Another one for 5,000 tons is also pending. Our quotations f. o. b. Birmingham, to which $3.75 freight is to be added, follow:

No. 1 southern	$13.00 to 13.50
No. 2 southern	12.50 to 13.00
No. 3 southern	12.00 to 12.50
No. 4 southern	11.50 to 12.00

Coke.—The market shows no improvement in regard to prices, but quite a number of contract customers who had asked to have their shipments held up have since requested that they be resumed. More inquiries were received last week for prompt and future shipments. A rumor is current in St. Louis that the freight of $2.40 on Virginia coke when destined beyond St. Louis will be increased to $2.75 on March 29. Our quotations follow:

Best selected Connellsville 72-hour foundry, $2.50 to $3, f. o. b. ovens for all shipments; other grades, $2.10 to $2.25. Furnace coke, 48-hour, $1.50 to $2.50 ovens. The freight rate to East St. Louis is $2.80 and to St. Louis, $2.90. Virginia select 72-hour foundry coke, $2.25 to $2.50 for immediate and future shipment; furnace, $1.50 to $2. The freight rate on Virginia coke is $2.80 to East St. Louis, $2.90 to St. Louis and $2.40 when destined beyond St. Louis.

Finished Material.—Real estate men say that February will go down in history as the month that saw the end of the financial flurry and restored old conditions. Important sales were made and some big building projects were launched. Over 900 real estate transfers were recorded during the month, representing a total value of $2,500,000. On last Friday the St. Louis Coliseum Co. reported that the funds for the new building, which will be a steel structure, at Washington and Jefferson avenues, were in, and that the work on the building would be begun at once. The building will cost $260,000.

Old Material.—No change in the scrap iron market developed last week. Our quotations remain as follows:

Old car wheels, gross ton	$18.00
Cast scrap, No. 1 R. R., net ton	11.00
Cast scrap, heavy machinery, net ton	12.50
Cast scrap, light, net ton	10.00
Old iron axles, net ton	14.00
Old steel axles, net ton	12.50
Steel turnings, net ton	6.00
Miscellaneous steel rail, under 4 ft., net ton	9.00
Cast iron borings, free, net ton	4.00
Wrought pipe, net ton	8.00
Sheet iron, net tons	4.00

BUFFALO.

Improvement in Collections—Larger Melt of Foundries.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Mar. 3.

Pig Iron.—There has been quite a noticeable improvement in collections during the past week and many accounts which were extended are now being liquidated. Inquiries come in with intermittent rushes and an increase of small lot sales is reported, some of them for forward delivery during the first half. The most cheerful news obtainable continues to come from the melters, who report an encouraging amount of inquiry for castings and some real orders. Market prices continue at the same figures as given last week, valley iron being quoted $16 furnace, or $17.50 delivered Buffalo, while prices for southern range from $12.50 to $13 Birmingham. The lower prices are quoted by the smaller producers. We quote as follows for first half delivery f. o. b., Buffalo:

No. 1X foundry	$17.80 to 18.30
No. 2X foundry	17.30 to 17.80
No. 2 plain	16.80 to 17.30
No. 3 foundry	16.30 to 16.80
Malleable Bessemer	17.50 to 18.00
Gray forge	16.00 to 16.50
Charcoal	23.00 to 24.00

Finished Materials.—The placing of an order for 1,950 cars by the Grand Trunk Pacific R. R. with the Canadian Car Co. of Montreal has resulted

in orders in turn being placed with the United States Steel Products Export Co., the Hamilton Steel & Iron Co., and the Nova Scotia Steel Co., for wheels, axles, drawbars, etc.

BIRMINGHAM, ALA.

Iron Being Sold in Small Lots—Home Consumption Decreasing.

March 3.

Alabama manufacturers are selling some iron, but it is in small lots. The aggregate, however, is better than it has been at any time this year and is promising for an improvement at no distant date. The home consumption is falling off. The latest industry to shut down is the Bessemer, Ala., rolling mills (Tennessee Coal, Iron & Railroad Co.) which were not in operation very long. As with the big pipe plant at Bessemer, the statement is given out that the shut down is only temporary and that it will not be long before there will be a resumption. Reports are current that two more furnaces will be ignited during the early part of this month, no definite date being announced. One of the furnaces at Ensley (Tennessee Co.) manufacturing basic iron, made more iron by a good deal than the average one day last week. All the industries in Ensley, including the steel plants have been doing well recently, the machinery responding to every effort being put forth.

The work on the new raw material bins at the Ensley furnace plant is nearing completion. The Pittsburg Construction Co. is adding more labor to the force working on the additional open-hearth furnaces in the steel plant.

The Republic Iron & Steel Co. has blown in its No. 1 furnace at Thomas in the immediate Birmingham district, and will shortly blow out its No. 3 ironmaker for relining. The Republic company has three furnaces at Thomas, but only one of them has been in operation. The company has a small demand for its product. No. 3 furnace may continue in operation until near the end of the month before it will be absolutely necessary to shut it down.

BRITISH IRON MARKET.

Advance of One Shilling in Pig Iron—Mixed Conditions.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 22.

Reports with regard to pig iron this week are decidedly mixed. Everyone expected that the impending ship building lockout would accelerate the slump in pig iron, yet we have had in Cleveland an advance in prices of about one shilling, lifting the standard to 1s 6d above the minimum. Cleveland warrants this week have been up to 49s 6d ($12.12), yesterday's quotation alone showing an advance of 3d. Once again stocks are reducing, yesterday's amount in store being 93,827 tons. There is also a stronger tone in hematite on the east coast, mixed numbers having gone to 58s 6d ($14.32). This is attributed to an improved demand from Sheffield and the continent. So far, the west coast has not shared the improvement, mixed numbers being down to 59 shillings ($14.44). It is not a little strange that alongside this northern improvement has to be recorded increased weakness in the Midlands, all irons but the best foundry qualities being down about one shilling. Northampton, for example, is now obtainable at 48s ($11.74), Derbyshire 50s ($12.24), and South Staffordshire 51s ($12.48). This is due to the keener competition for orders by Midland furnaces, whose contracts are practically worked off, though to this rule there are important exceptions. The one cheerful element is undoubtedly an increase of buying. Generally speaking the impression is that things may now take a turn for the better. In regard to west coast hematite, the severity of the slump may be judged from the fall in price from 82s 6d ($20.20), the standard figure of 10 months ago.

An unexpected development this week has been an inquiry from a New York firm addressed to a leading Glasgow house for several hundred tons of hematite iron. The quality is of a special class and it is expected that the order will go to Cleveland. No great significance is attached to the prospective order which is regarded as quite an exceptional thing, and there are reports on the other hand that southern basic pig iron has been sold for shipment from America as ballast in cotton carrying boats for the Mersey. This apparently is no more seriously regarded than the American purchase, the belief being that with British prices at the present figure there is poor prospect for intending American competitors.

METAL MARKET

CHICAGO.

March 3.

There was a continued absence of sales during the week but the inquiry for both immediate and future delivery materials was much improved. Spelter has a slightly stronger position. Quotations remain unchanged from last week. Our prices are:

Lake copper, 14c to 14¼c; casting, 13½c to 13¾c; pig tin, 32c to 32½c; spelter, 5c to 5.10c; pig lead, desilverized, 4c to 4.10c in 50-ton lots; corroding, 4.60c to 4.75c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list, f. o. b. LaSalle, in car lots of 600-pound casks; Cookson's antimony, 12½c to 13c; other grades, 12c to 12½c.

Scrap copper and brass were off in price during the week and we have lowered our quotations. Other metals are without change. We quote to dealers as follows:

Copper wire, 10½c; heavy copper, 10½c; light copper, 9½c, heavy red brass, 9½c; heavy yellow brass, 7½c; light brass, 5c; No. 1 red brass borings, 7½c; No. 1 yellow brass borings, 7c; brass clippings, 7½c; tea lead, 2¾c; lead scrap, 3⅛c; zinc, 3⅜c; tin pipe, 22c; tin foil, 18c; pewter, 15c; electrotype plates, free from wood, 3⅞c; electrotype dross, 2⅞c; stereotype plates, 4¼c; stereotype dross, 3c; prime slab zinc dross, $62 per ton.

Brown & Sharpe are now changing the location of their Chicago store from 16-18 South Clinton to 107 Washington Boulevard.

The H. A. Stocker Machinery Co., Chicago, will move about May from its present salesrooms, 20-22 South Clinton street, to the corner of Randolph and Jefferson streets.

The Chicago Screw Co. will shortly move into its new quarters at 51 South Clinton street.

George Nash & Co., Chicago, handling iron and steel, have moved from South Clinton street to 115 Washington Boulevard.

ST. LOUIS.

March 2.

Lead and Zinc.—Shipment of zinc from the Joplin district last week was the largest of the year, exceeding the previous week by eight tons, but the lead shipments were 40 tons less than the previous week. The high price for zinc remains unchanged at $40 a ton, with an assay base offering of $36 to $37 a ton for 60 per cent zinc.

The total shipments of zinc and lead ores from the Missouri-Kansas district for the week ending Feb. 29, and their values were: Zinc shipments, 9,314,140 pounds; values $163,363. Lead shipments, 1,178,570; values, $29,083.

UNITED ACTION

In Selling Pig Iron Urged by Pittsburg Foundrymen's Association.

In line with the general policy now being promoted, for the encouragement of the return of general confidence to the iron and steel industry and to business affairs in general, the Pittsburg Foundrymen's Association at a meeting in the Hotel Henry in that city March 2, added its voice in urging the adoption of a minimum price of pig iron by furnace operators. The resolution which was adopted by the unanimous vote of the association is as follows:

"Resolved that the Pittsburg Foundrymen's Association gathered in regular session, March 2, recommends to the manufacturers of pig iron that they take action toward establishing and maintaining a minimum price for standard grades of pig iron in order that the foundrymen may rely upon the basis established for the purchase of pig iron."

In discussing the proposed resolution, W. H. McFadden, vice president of McIntosh-Hemphill & Co., Pittsburg, said in part: "Such recommendations as this expressed by the foundrymen will go a long way toward taking the gambling spirit out of a legitimate business. The determination of a stable basis will enable the foundrymen to know the cost of the raw material that enters into his product and will encourage him to accept contracts without the fear that prices are unstaple. In this way will confidence return and prosperity be resumed. It is not for Pittsburg alone that we should do this, but for the whole United States." Mr. McFadden urged a broadness of thought among business men for the common good and others of the association who spoke upon the resolution advanced a similar sentiment.

President H. E. Field of the association in reporting to the members the deliberations of the recent joint meeting at Philadelphia of the Philadelphia Foundrymen's Association with representatives of the New England and Pittsburg associations, told of the progress being made in the solving of the problem of railroad shortages. The result of a conference with the representatives of all but one of the leading railways handling coke and pig iron, has been the appointment of a general committee to act for both the foundrymen and the railroads in this contention. "It looks as if the committee will be able to reach the solution of a problem which has been troubling the foundrymen for years," said Mr. Field.

This committee, which will meet at Philadelphia for the consideration of the problem, is composed of the following: J. L. Anthony, New England Foundrymen's Association; H. E. Field, Pittsburg Foundrymen's Association; S. D. Sleeth, Pittsburg Foundrymen's Association; W. S. Hallowell, Philadelphia Foundrymen's Association; J. O. Henshaw, Woodward Iron Co., and Virginia Iron, Coal & Coke Co.; Leonard Peckett, Empire Iron & Steel Co.; John Jamison, Jamison Coal & Coke Co.; R. H. Large, Pennsylvania Railroad Co.; R. C. Wright, Pennsylvania Railroad Co.; G. R. Browder, Southern railway; H. M. Mathews, Baltimore & Ohio Railway Co.; T. W. Galleher, Baltimore & Ohio railway; F. S. Holbrook, New York, New Haven & Hartford railway; A. S. Crane, Boston & Marine railway; F. E. Herrimen, New York Central & Hudson River Railway Co.; C. S. Hoskins, Merchants' & Miners' Transportation Co.; Abel Wishler, Davis Coal & Coke Co.; and two others, one from Philadelphia and one from New England who are yet to be appointed.

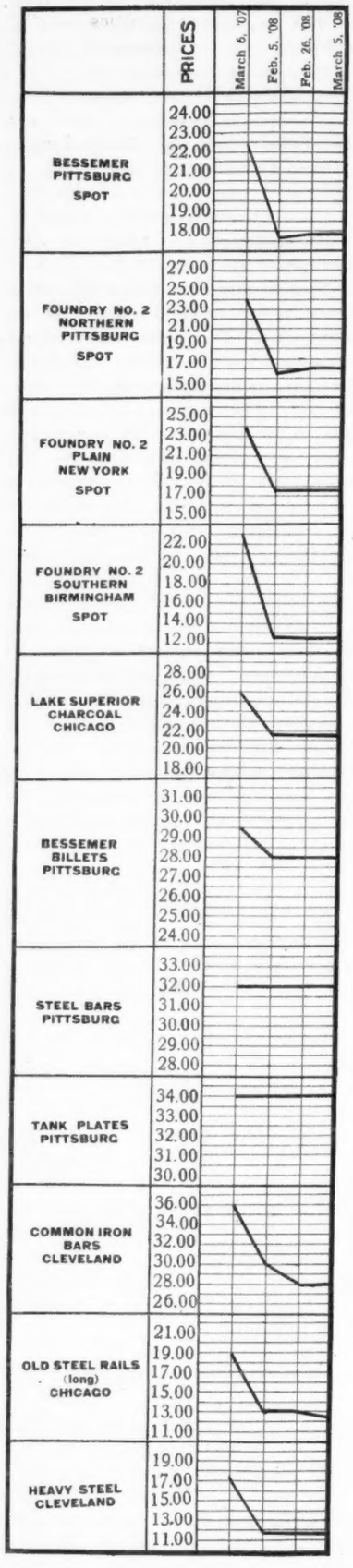
Another action of importance taken by the Pittsburg association was the adoption of a motion authorizing the appointment of a committee of five members to solicit funds for original research work to be carried on under the direction of the American Foundrymen's Association.

The papers of the evening were presented by G. R. Brandon, of the Whiting Foundry & Equipment Co., Harvey, Ill., on "Charging Machines for Cupolas" and by Benj. Fuller, of the Westinghouse Electric & Mfg. Co., at Cleveland, on "Core Ovens."

Avoiding Heavy Charges.—The Lake Superior Iron & Chemical Co., owning the Newberry, Manistique and other charcoal furnaces in the northwest, has called in and cancelled its entire issue of $6,000,000 in bonds. This policy has been along the line determined by large industrial corporations for avoiding over-capitalization and weighing down their properties with heavy fixed charges. While yet but one-half of the total amount of bonds authorized last May had been issued and while these had been taken by the stockholders, yet their recall and destruction were deemed best, each stockholder being given in exchange for his holdings an equal amount of 7 per cent preferred stock of the company. Reports recently made show the company in most satisfactory condition.

The Pittsburg Car Service Association reports 122,130 cars handled by 19 different lines in its territory during January. This is a reduction of 44 per cent over the corresponding month of 1907.

PRICE CHART.



INCREASE IN PRODUCTION OF STEEL-MAKING IRON

Our blast furnace statistics for the month of February show a considerable increase in production, which is entirely due to the increase in production of steel-making iron, there being a decided decrease in the merchant tonnage. The total production for February, inclusive of spiegel and ferro is 1,233,074 tons against a production in January of 1,081,813 tons. The increase in daily capacity is shown by the fact that the average daily production in February was 42,519 tons, against a daily production in January of 34,316 tons. The number of stacks in blast in February was 152, an increase of 13 over January. The total production for February is divided as follows: Merchant iron, 346,835 tons, a decrease of 44,065 tons from January, and non-merchant production, 877,545 tons, an increase of 206,372 tons or almost 33 per cent. The greatest increase in tonnage is in Ohio, which made approximately 88,000 tons more iron in February than in January with three more stacks in blast. Pennsylvania had an increase of approximately 10,000 tons with one more stack in blast. Alabama increased its production about 8,000 tons with three more stacks in blast, while the increase in Virginia was about 1,000 tons with two more stacks in blast. The group comprising the states of Tennessee, West Virginia and Kentucky increased its production 3,000 tons with one more stack in blast in each state. New York, which is largely a maker of merchant iron, showed the heaviest decrease, amounting to about 25,000 tons with the same number of stacks in blast. New Jersey showed a decrease of about 3,000 tons with the same number of stacks in blast. The group comprising Maryland, Colorado, Wisconsin and Indiana showed a decrease of about 4,000 tons with the same number of stacks in blast. The Georgia - Texas - Minnesota - Michigan - Missouri group showed a decrease of 2,000 tons with the same number of stacks in blast. Illinois was the only steel-making state to show a decrease, which amounted to about 15,000 tons, the number of stacks in blast remaining the same. In some cases the increase in production can be accounted for by the blowing in of stacks of larger capacity, while smaller ones went out, as the heavy increase in production is not consistent with the increase in the number of furnaces in action. The active daily capacity in blast at the end of February is 39,542 tons against a corresponding figure in January of 35,248 tons, showing a distinct improvement in the situation.

FEBRUARY FURNACE REPORT.

STATES—	NO. OF STACKS.	NO. IN BLAST ON LAST DAY OF MONTH. FEB.	JAN.	PERCENTAGE OF TOTAL POSSIBLE OUTPUT MADE.	AV. DAILY CAPACITY IN BLAST LAST DAY OF MONTH.	ACTUAL TONNAGE MADE. MERCHANT.	NON-MERCHANT.	TOTALS. FEB.	JAN.
Pennsylvania	158	62	61	39.7	18,314	97,769	440,026	537,795	527,017
Ohio	61	23	20	38.1	8,822	60,019	185,423	245,442	157,544
Alabama	46	17	14	35.6	3,376	59,440	34,894	94,334	86,036
Virginia	24	8	5	32.9	222	19,414	———	19,414	18,451
New York	24	8	8	33.3	1,653	39,456	8,381	47,837	73,749
New Jersey	10	4	4	40.0	685	19,880	———	19,880	22,447
Illinois	24	11	11	44.2	3,252	7,550	182,317	189,867	106,034
Tennessee	18	9	8						
West Virginia	4	1	0	37.9	814	4,090	16,766	20,856	17,244
Kentucky	7	1	0						
Maryland	4	1	1						
Wisconsin	6	2	2						
Colorado	6	3	3	41.2	1,639	36,998	9,738	46,736	50,110
Indiana	1	1	1						
Georgia	2	0	0						
Texas	2	0	0						
Minnesota	1	0	0	12.5	76.5	2,219	———	2,219	4,531
Michigan	2	1	1						
Missouri	1	0	0						
Spiegel—All states								3,952	13,616
Ferro—All states								4,742	5,034
Totals	401	152	139	———	39,542	346,835	877,545	1,233,074	1,081,813

The pig iron production of the country by months in 1907 in gross tons is as follows:

	1907.	1908.
January	2,194,801	1,081,813
February	2,047,036	1,233,074
March	2,216,709	.....
April	2,226,708	.....
May	2,291,030	.....
June	2,237,420	.....
July	2,253,243	.....
August	2,243,656	.....
September	2,174,148	.....
October	2,359,690	.....
November	1,820,558	.....
December	1,234,733	.....

BANQUET AT PITTSBURG.

Sixty-two heads of departments of the Pittsburg Valve, Foundry & Construction Co. gathered at the Hotel Henry, Pittsburg, Thursday evening, Feb. 27, to participate in the fourth annual banquet of the company, as the guests of Major J. T. Speer, president of the company. Major Speer, in the capacity as host and toastmaster, spoke feelingly of his appreciation of the services rendered during the year by those assembled at the dinner, and said that through the efforts not of the company as a company, but through the conscientious and painstaking efforts of the men in his employ, the past year has been the greatest in the history of the concern. He commended the heads of departments on the personal interest they displayed in all affairs concerning the company, remarked on the few changes that had been made, of the few new faces to appear around the banquet board from year to year, and in turn called upon practically all present for a few remarks. The executive department, treasurer, auditor and general manager, the sales department, cost and accounting departments, the foundry, pattern shop, brass foundry, pipe shop, and in fact every branch of the big business, was represented. W. H. McFadden, of Mackintosh, Hemphill & Co. and John A Penton, of the Penton Publishing Co., Cleveland, were guests of Major Speer, and spoke briefly.

MAJOR T. SPEAR.

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OUR BALANCE OF TRADE.

The following shows our apparent balance of trade for the calendar year 1907:

Exports	$1,923,395,267
Imports	1,423,289,693
Excess	$ 500,105,574

This excess has been exceeded only three times, in 1893, 1900 and 1901. When such a result is observed, there is usually some hasty congratulation.

The total imports and exports in 1907 were $3,346,000,000. That is $228,000,000 more than the total imports and exports in 1906, $540,000,000 more than the total in 1905, and in still greater excess of the totals for previous years. When such a result is observed, there is also, usually, indulgence in hasty congratulation.

Either showing may itself be in a measure good, but the goodness of the entire showing is not the sum of the goodness of its parts, as one detracts from the other, and that is a fact which is generally lost sight of. There is an invisible balance of trade, which can be explained only in quite general terms, which invisible balance of trade prevents us from bankrupting the rest of the world, as otherwise we should have done long ago. This invisible balance of trade comprises among many other things, over-valuation of exports and under-valuation of imports, freights paid to foreign carriers, gold and silver movement, movement of securities, interest and dividends on securities, etc.

It happens that just 10 years ago, in 1898, there was the greatest favorable balance of trade which had ever been recorded, $620,000,000. Ten years earlier, in 1888, there was an adverse balance of trade, $34,000,000, the only one since 1873.

These and other considerations divide the movement quite clearly into two 10-year periods, as follows:

1888 to 1897:—	
Total exports	$ 8,917,000,000
Total imports	7,667,000,000
Favorable balance	$ 1,250,000,000
Total movement	$16,584,000,000
1898 to 1907:—	
Total exports	$15,119,000,000
Total imports	10,067,000,000
Favorable balance	$ 5,052,000,000
Total movement	$25,186,000,000

Now, of course, it is well that our favorable balance of trade quadrupled from one 10-year period to the next. It is also well that our total commerce increased by one-half, but it is an egregious blunder to take full credit for the increase of one-half in our total commerce, and then proceed to take full credit for the quadrupling in the apparent favorable balance of trade. With respect to many of the items which go to make up the invisible balance of trade, it is necessary that they should increase when our total commerce increases. They are partly the mere cost of doing business, and profit us nothing.

Forces have been at work during this last 10-year period, of which we are now feeling the effect, but of which the usual scrutinies of our foreign commerce, from the statistics, have not apprised us. These figures have shown, during the 10 years, a great increase in our foreign commerce, and they have shown a continuance of a fairly large favorable balance of trade, but it is a fact that this balance has been decreasing, while, as noted, it ought to increase, in order to pay expenses on the much larger business we are doing. This it has signally failed to do.

The first three and last three years of this latest 10-year period, 1898 to 1900, showed the following:

1898 to 1900:—	
Total exports	$4,009,000,000
Total imports	2,263,000,000
Favorable balance	$1,746,000,000
Total movement	$6,272,000,000

Percentage, exports to total movement 63.9 per cent.

1905 to 1907:—	
Total exports	$5,349,000,000
Total imports	3,923,000,000
Favorable balance	$1,426,000,000
Total movement	$9,272,000,000

Percentage, exports to total movement, 57.7 per cent.

Comment is superfluous. Our favorable balance actually decreased, while the total amount of business we did increased by one-half. Our paper profits decreased, while the expense of doing business must certainly have increased. There is a volume of explanation in these figures.

A CONSERVATIVE POLICY IN IRON AND STEEL EXPORTS.

The total exports of iron and steel in January of this year, statistics of which became available this week, show a total of 74,352 gross tons. This covers scrap, pig iron, billets, etc., and all finished products of which the tonnage is returned, including fabricated structural material, pipes and fittings, nails, etc.

This total compares with 102,620 tons in January of last year, and a monthly average during 1907 of 108,548 tons.

These statistics are the best refutation possible of the claims being put forth now and then, evidently more for the purpose of supporting an argument than as a result of an examination of actual movements, that the steel manufacturers are disposed to dump surplus product abroad at this time when the domestic demand is not sufficient to permit full operations.

There has been ample time, since the reduction in domestic demand last fall, for steel manufacturers to effect sales abroad and have the shipments appear in the statistics now available. Instead of this, there is an actual decrease in exported ma-

terial, which is due to the lessened activity in the international markets which was observed before any change appeared in the domestic trade. As is well remembered, last October was the record month in tonnage output in the history of the American iron and steel industry. Months before that time, however, the international markets began reflecting a lessened activity.

It has often been pointed out in the past two years that exported iron and steel products have been bringing much better prices than formerly. In most cases they are stated to approximate quite closely to the rates prevailing in the domestic market, and it is evident that the policy pursued by steel manufacturers in the past few months has been to maintain prices in the export market, even at the expense of tonnage, just as they have been doing so successfully in the domestic market.

Iron and Steel Exports, January, 1908, Gross Tons.

Scrap	1,516
Pig iron	2,546
Crude steel	5,317
Rails	16,285
Structural	11,017
Bar iron	407
Wire rods	595
Steel bars	5,101
Hoops, etc.	934
Iron sheets and plates	3,302
Steel sheets and plates	4,581
Tin and terne plates	963
Wire	12,022
Cut nails and spikes	449
Wire nails and spikes	2,678
All other, and tacks	559
Pipes and fittings	6,075
Total	74,352
Total, January, 1907	102,620
Total, 1907	1,302,625
Total, 1906	1,325,740

The distribution of these exports as to character of material is quite significant. They run quite largely to the finely finished products, where American methods and machinery tell most in reducing cost of production. The total exports in January, for instance, were 74,352 tons, while four items, wire, wire nails, steel bars and pipes and fittings comprised 25,876 tons, or more than one-third. These lines constitute much less than one-third our total output. They are the lines in which cost of production has been especially reduced by the use of automatic machinery and the elimination of hand labor. It is a movement diametrically opposite in character to those which have occurred in the past, when pig iron and crude steel have been exported in large tonnages at sacrifice prices. It is safe to say that nearly all the iron and steel exports at the present time are earning very satisfactory profits.

MEDALS AWARDED

For Meritorious Papers by Engineers' Society of Western Pennsylvania.

Marked by a high tide of enthusiasm and good fellowship that manifested itself at every stage of the evening's festivities, the annual banquet of the Engineers' Society of Western Pennsylvania was held at the Hotel Schenley, Pittsburg, Saturday evening, Feb. 15, in which 150 engineers, many of them prominent in iron and steel pursuits, participated. The gathering was largely social in its nature, the set program of the evening, consisting of a limited number of addresses upon subjects of general interest to men of commercial affairs.

At the conclusion of the serving of a sumptuous menu, Prof. Albert E. Frost, of the department of physics, Western University of Pennsylvania, presiding as toastmaster, presented the speakers of the evening. "Some Experiments in Education" was the topic discussed by Dr. Marshman E. Wadsworth, newly-elected dean of the school of mines of the Western University of Pennsylvania. Dr. Wadsworth spoke upon various methods employed by the educator and outlined their results. He took the opportunity to announce the plans held in view for the development of the mining school of which he is now the head.

The duty of man toward his fellowman was the theme of Dr. J. Leonard Levy in speaking upon "Some Problems of the Day." He made a special plea for international arbitration among nations and for a broad morality among men, which is not limited or hedged by mere differences of creed. Hon. John C. Haymaker, judge of the common pleas court of Pittsburg, presented "Fellowship Among the Professions."

The feature of leading interest of the evening followed in the bestowal of the society medals upon those members, whose papers read at the meetings of the organization, had been adjudged to be the best of the year. This impressive ceremony is a new plan adopted by the society for the recognition of meritorious research work among its membership, this being the first time it has been carried out.

The honor of being the gold medalist of the society was accorded to Henry S. Pritchard, of the American Bridge Co. for his paper on "The Proportioning of Steel Railway Bridge Members," which was prepared and read by him immediately following the Quebec bridge disaster. The silver medal was awarded to Col. Thomas P. Roberts, connected with the United States engineers' office of Pittsburg, for his paper, "Floods and Means of Their Prevention in Our Western Rivers." The presentation of the medals was made by James O. Handy and each recipient appropriately responded. The medals will remain in their permanent possessions.

The 1908 officers of the Engineers' Society of Western Pennsylvania consist of the following: President, James K. Lyons; vice presidents, Geo. T. Barnsley, Edwin K. Morse; secretary, Richard Hirsch; treasurer, Albert E. Frost; directors, Robert A. Cummings, Walter Riddle, F. Z. Schellenberg, James O. Handy, Harrison W. Craver, Sergius P. Grace, Julian Kennedy, Samuel M. Kintner; reception committee, Walther Riddle, chairman; Sumner B. Ely, Edwin H. Haslam, Paul M. Lincoln.

COMMITTEE CHAIRMEN APPOINTED FOR A. F. A. CONVENTION.

Toronto, Canada, Mar. 2.—Preparations are going forward in connection with the holding of the convention of the American Foundrymen's Association here in June and representative committees are being organized. The following chairmen of committees have been appointed: Entertainment, Frederick Sommerville, Sommerville, Ltd., Toronto; finance, Peter McMichael, Dominion Radiator Co., Toronto; press, W. W. Near, the Page-Hersey Co., Guelph; grounds and buildings, Robert Cluff, King Radiator Co., Toronto.

Rogers, Brown & Co. of Buffalo have taken the selling agency for the Atikokan blast furnaces and will probably open an office in Toronto. The Atikokan company has hitherto found it difficult to dispose of its pig iron on account of the uncertainty of manufacturers as to its suitability for their uses, and some 2,000 tons were lying at the wharf here. Rogers, Brown & Co. have induced some manufacturers to take it on trial, and so far the results have been satisfactory. The iron grades favorably and promises to be a strong, soft iron.

SOME IMPROVEMENT

In Sheffield Steel Trade, But Conditions Are Not Satisfactory.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng. Feb. 22 1908

Notwithstanding the slight improvement in the Sheffield steel trade, matters are far from cheerful in regard to trade generally. The feature of Thursday's iron market in Birmingham was the general slight decrease in the prices of finished iron. Unmarked bars are now selling at £6 12s 6d, and for good orders makers would be very glad to shade even these prices. Poorer qualities of unmarked bars are selling in parts of the district at £6 5s. Hoops, strip and sheets are all marked cheaper. But the galvanized department is somewhat more active, and this has enabled the makers at their monthly meetings in London to confirm the £12 10s f. o. b. figure, and to add 5 shillings to the extra charge for 30-gage sheets. This is an increase from 45 shillings to 50 shillings in the charge for very thin qualities, bringing the total charge up to £15. Some time ago the extra charge was lowered from 55 shillings to 45 shillings, so that this is a partial restoration. A number of forges in the Black Country are working short time.

Steel is practically unchanged, but foreign dumping is almost non-existent, the only exception being South Wales which is taking a few billets from Belgium and Germany. Foreign makers have practically no hope of competing against the very low price to which British steel has been rushed down, in the resolute effort to shut out the foreigner. There is a good deal of grumbling over the high price of coal which, it is said, is the main element in keeping up prices. Colliery proprietors are under rather heavy charges in respect of compensation insurances and they are bitterly complaining about the impending eight hours bill for which the government is already sponsor, and which is promised in the king's speech. Nobody has any hope that this new legislation will be staved off. A rather better tone is apparent in the South Wales steel trade, and the tinplate department shows a welcome improvement.

TEMPORARILY EMBARRASSED.

The Robert Field Co., of Cincinnati, O., doing a business in pig iron and coke, was placed in the hands of a receiver in the supreme court in that city on Monday, March 2, on a suit filed by its president, Robert Field. O. L. Layne was named as receiver and his bond fixed at $50,000. Robert Field, president of company, said:

"The appointment of a receiver for this company is most unfortunate, but I believe it will be temporary only. Continued falling off in business since last July, together with the recent panic, has been more than we could stand up under, and as a few of our creditors were pressing, our directors thought best to place our affairs under the protection of the local courts. Our assets are slightly over $110,000 and liabilities $85,000, and but for the fact that some large accounts, which will ultimately work out all right, are now tied up, we would have experienced no difficulty in meeting our obligations. There has been no reduction of force in the sales department, and we will hold the organization together in order to retain the connections which give us nearly 500,000 tons of material each year. I am most hopeful as to the future and feel there is no cause for concern on the part of any creditor or friend."

O. L. Layne, the receiver, has been cashier of the company since its organization and was selected because of his thorough fitness.

DINNER TENDERED TO C. H. DOMHOFF.

The officers and office force of the Domhoff & Joyce Co. of Cincinnati tendered to the retiring president of the company, C. H. Domhoff, a complimentary dinner at the St. Nicholas hotel on Saturday evening, Feb. 29. There were present also some close personal friends of Mr. Domhoff, including T. J. Joyce, who retired from the business of the firm about four years ago. John Sargeant, the newly elected president of the company, acted as toastmaster. Among those who spoke were A. D. McLeod and A. H. McLeod, of the C. H. & D. R. R., E. C. Humphreys, the vice president of the company, C. H. Jenkins, secretary, and other members of the force. All joined in wishing Mr. Domhoff long life and enjoyment of the fruits of his labors and satisfaction in the rest he proposes to take after the long period of his activity in pig iron business. Mr. Domhoff has planned a European trip and was presented with a handsome traveling bag.

The company was originally formed by C. H. Domhoff, T. J. Joyce and John Sargeant 12 years ago. The three original members of the firm were for a long time with Mathew Addy & Co. Success crowned the efforts of the firm from the start. Until his retirement a few weeks ago, Mr. Domhoff has been the executive head of the firm.

NEW FABRICATING PLANT CONSTRUCTION PROCEEDS STEADILY.

Construction work is proceeding rapidly upon the new fabricating plant which the Des Moines Bridge & Iron Co., Des Moines, Ia., has in the course of erection at Neville Island, Pa. The company is now doing some plain beam work at the new plant and it expects in a month or six weeks to be in a position to handle contracts of a general character. The new plant, which will serve as an eastern branch of the Des Moines works of the company, will handle ordinary building work, ranging up to heavy bridge fabrication and later arrangements may be made to include this latter class of structural material. A specialty is made by the company of water tower work and it is expected to take up this line extensively in the east. The principal buildings of the Neville Island plant will be a main building, 120 x 150 feet, machine shop, 50 x 100 feet and blacksmith shop, 50 x 100 feet. When in full operation, the plant will have a capacity for turning out from 500 to 1,000 tons of material monthly. The erection of the new plant is in charge of H. L. Eastman.

SOUTHERN STEEL RECEIVERS FILE REPORT.

Receivers of the Southern Steel Co., which was thrown into bankruptcy in October, filed a lengthy final report with the special referee at Birmingham, Ala., Feb. 27. They ask to be compensated and discharged. As soon as they are discharged the trustees elected by the creditors will take charge. The receivers report that the balance in bank is $137,249.47 and in treasury $2,607.47. The total liabilities of the company are $9,000,000, of which $5,000,000 are first mortgage bonds, and $2,000,000 unsecured credit. There is over $900,000 to pay the unsecured creditors. The holders of the mortgages will receive all due them. The committee on reorganization will shortly have the plan well in hand, which is to foreclose the mortgage and buy in the property, it is said.

PLANS APPROVED.

Westinghouse Reorganization Taking Shape With Creditors' Consent.

Affairs of the Westinghouse Electric & Mfg. Co. and the Westinghouse Machine Co. are shaping themselves in the direction of the lifting of the receiverships under which the operations of these companies have been conducted for the past four months. Following a meeting of the creditors' committee of the Westinghouse Machine Co. at Pittsburg, Feb. 28, it was announced that the plan submitted to all creditors for the rehabilitation of the company had been approved by more than 99 per cent of the claimants. The plan which the creditors have thus approved contemplates the issuance to the creditors of $7,200,000 of 6 per cent notes payable in three years from Jan. 2, 1908, and secured by bonds of the company taken at 85 per cent of their face value, thus entailing a total bond deposit of $8,471,000 face value. The notes will be in $500 denominations, and will offset all claims over and above $1,000, but obligations of $1,000 and less are to be paid in cash.

The final step in the lifting of the receivership, which is now made possible by the action of the creditors, will be the formal application to the court by the officers and creditors of the company for the discharge of the receivers, and the returning of the property to the stockholders. The receivers of the Westinghouse Machine Co. are Wm. McConway, W. H. Donner and E. E. Keller.

The committee for the readjustment of the debt of the Westinghouse Electric & Mfg. Co., of which James N. Jarvis, of the Real Estate Trust Co., Pittsburg, is chairman, has given notice to holders of the convertible sinking fund 5 per cent gold bonds, 5 per cent debt certificates, three-year 6 per cent collateral notes and other paper of the floating debt, that the time for deposit of such obligations has been extended to and including March 31. Under the original plan of reorganization, the date of March 1 was set as the limit for the receiving of the deposits, but the committee has deemed it wise to make the extension.

Anticipating the success of the plan for lifting the reeciversship of the Westinghouse Electric & Mfg. Co., a meeting of the stockholders has been called for April 29. At that time an issue of first mortgage bonds and an increase in the capital stock will be considered. The method proposed by the creditors' committee for the rehabilitation of the company calls for the sale of $7,000,000 new stock at par and the call for a meeting of the stockholders is in expectation that this plan will be accepted by the holders of the company's obligations.

FOR TRADE SCHOOLS.

New York Manufacturers Plan Establishment Through Co-operation.

Trade schools and mechanical museum for Brooklyn with the co-operation of the board of education have been planned by the Manufacturers' Association of New York. The association favored at a recent meeting the adoption of the plan suggested by Chairman Charles N. Chadwick, of Chadwick's report asked that manufacturers with adequate facilities of room and plant for such purposes who are willing to co-operate with the board of education for the establishment of trade schools be requested to communicate with the Manufacturers' Association through its secretary. Further, that a joint committee be named by the board of education and the Manufacturers' Association to plan for the establishment of proposed trade schools. The report says further:

The purpose of the plan is co-operation on the part of the employer, the employe, the public and the state acting through its board of education. The establishment of these trade schools must be a growth, and in no sense a creation, beginning with two or three under favorable conditions. They will work themselves out under the impulse of personal initiative, self-reliance and individual variation.

The teachers should be those who have worked for wages in the trade and are trained and competent to teach, the steps at present to be attained being the willingness of the manufacturer to afford the facilities, the acceptance of these facilities by the board of education, the working out of the plan through a joint committee of each, the final establishment of these schools near the industry they are intended to serve, and finally, the diploma which is the evidence of the right to work at the trade.

Your committee further suggests, as a part of the general scheme, and as a valuable adjunct to the system of trade schools, the establishment of a mechanical and industrial museum, in connection with the Brooklyn Institute, to be located on the Eastern Parkway.

The Royal Typewriter Co., which is moving from Brooklyn, N. Y., to Hartford, Conn., began Feb. 17 the partial operation of its big plant recently erected. The firm has capacity of ultimate employment of 1,000 hands. Allan A. Ryan, son of Thomas F. Ryan of New York is interested.

AUTO BUILDERS ACTIVE.

General Cleveland Machine Market Dull—New Designs in Hand.

Machinery manufacturers in the Cleveland district are laboring under the same business handicap apparent throughout the country, although since the first of February the production has shown a slight increase. Plants are now running at from one-third to one-half capacity, although in certain lines they are running to between 75 and 90 per cent of their capacity. Orders for smaller tools seem to be more in evidence, with an occasional sale of the heavier tools. Sellers of railway shop supplies say that they find the market very difficult.

The local automobile industry appears to be the most active in the district. One leading Cleveland auto shop reports that it is employing additional new men fairly steadily, and is running at such capacity that it believes it will turn out fully 90 per cent of last year's production. At the automobile show held in this city recently, manufacturers' agents in attendance declared that their factories would turn out from 75 to 90 per cent of last year's production, basing their predictions on the activity in automobile lines which has prevailed during the past month or six weeks. Several of the larger machine shops in the city are taking advantage of the opportunity to design new machinery for machine shop as well as for foundry use, not only for themselves but for the general trade, figuring on the coming business revival. Machine manufacturers both west and south of Cleveland say that they find inquiries coming in more freely, and collections are somewhat better.

The American Steel Grave Vault Co., Galion, O., recently incorporated, has secured quarters in an industrial building at Galion and is in the market for a 25-horsepower gas engine, 8-foot brake, 8-foot roll, punch and shears, drill press, air compressor, hammers, etc.

EMPOWERED TO BORROW.

Receivers Maize and McGrew, of the P. P. Mast & Co., Springfield, O., agricultural manufacturer, have been authorized by the federal court at Cincinnati to borrow $50,000 on receivers' notes for no greater length of time than six months and at not more than 6 per cent. The receivers explain that the money will be expended for additional material to complete $400,000 worth of orders in course of construction.

CHILLED PLOW INVENTOR.

Death of James H. Oliver, Founder of Indiana Implement Industry.

James H. Oliver, inventor of the chilled plow and founder of the factory which bears his name at South Bend, Ind., died March 2, 84 years. He had been critically ill for some time past, his death finally resulting from heart disease and general debility.

Mr. Oliver was born on Aug. 28, 1823, at Whitehaught, Roxburyshire, Scotland, the son of a shepherd and when in 1834 the family came to this country and settled in Indiana, he was one of eight children. In 1837 the father died and the young man went to work at Mishawaka, Ind. He worked as a chore boy, dish washer, cook, digger of ditches and cooper before entering the iron business as an employe of the St. Joseph Iron Co. In 1857 he moved to South Bend to take charge of a foundry and it was about this time the industry of which he was the head and to which he devoted the energies of his life so unswervingly was started. Many misfortunes by fire and flood visited the small plant started with a capital of $55, but with the granting of the patents for chilling the plow steel in the period from 1867 to 1871 the real enlargement of the industry began.

Mr. Oliver was married in 1844 and the death of his wife in 1902 had much to do with the final breaking of his health. He is survived by a son and daughter. Mr. Oliver did much for South Bend and a splendid opera house costing $500,000, an hotel of unusual comforts and the present city hall which was made possible largely through the co-operation of the plow manufacturer, stand as monuments to his practical beneficence. A few years ago, the townspeople presented to him a $5,000 gold loving cup which is mounted and now stands in the lobby of the hotel which bears his name. Mr. Oliver never aspired to public honors of any kind.

OBITUARY.

Cicero Beckham, who conducted a foundry for 25 years at Georgetown, D. C., died at Washington, D. C., Feb. 20, aged 71 years.

John G. Gunzenhauser, pioneer engineer and owner of the Gunzenhauser foundries, Muscatine, Ia., is dead at his home in Iowa City, Ia., aged 65 years.

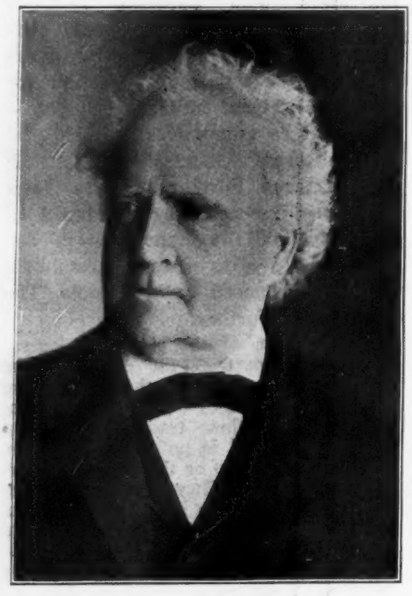
William F. Wood, for some years general superintendent of Caldwell & Drake's iron works at Columbus, Ind., died at Youngstown, O., a few days ago. The cause of death was paralysis.

John Long, superintendent of the Louisville, Ky., plant of the United States Cast Iron Pipe & Foundry Co., died Feb. 18 from pneumonia, aged 82 years. He had been superintendent of the foundry for nearly 20 years.

Joseph Lizotte, the inventor of the motor boat engine bearing his name, died Feb. 23 at his home, Quincy, Mass., aged 47. He was an expert machinist, and his gasoline engine for motor boats gave him a wide reputation.

Freeman C. Stewart, aged 77 years, died Feb. 20 at Columbus, Ga. For 30 years he was superintendent of the Columbus Iron Works after the civil war, and during the war he made the only breech-loading cannon known to have been made in the south at that time.

Tom Cobb King, a blast furnace manager well known in the Mahoning valleys and in the southern pig iron



JAMES H. OLIVER.

district, died Feb. 27 at his home in East Orange, N. J., from appendicitis. He was born in Marion, Ala., in 1865, the son of Porter King, a colonel in the confederate army. He was graduated from Howard college, Alabama, and was a member of the American Institute of Mining Engineers and of the British Iron & Steel Institute. He invented a process for separating iron ore and another for reducing nickel. His wife and son survive.

James Powell, president of the William Powell Co., Cincinnati, died Feb. 25. His illness began with a severe cold over a year ago. With his parents, who were temporarily located in Ghent, Belgium, he came to America at the age of three years. In 1846 his father, William Powell, began the manufacture of brass plumbing specialties, and this venture was the foundation of the manufacturing of plumbers' brass goods in the west, his son at that time being his only employe. In 1886 the business was merged into a stock company, with James Powell as president and manager, which offices he filled actively until his death. Mr. Powell was an inventor of note and a frequent contributor to journals and magazines. He was a member of the American Association of Mechanical Engineers, the National Association of Manufacturers, and the Manufacturers', Queen City and Business Men's clubs of Cincinnati.

PERSONAL.

Announcement is made that Charles G. Miner has become associated with Pickands, Brown & Co., Chicago.

W. K. Field has been elected president of the Hamilton Mfg. Co., Columbus, O., to succeed John H. Winder.

Richard Y. Filbert has been elected a director of the New Haven Iron & Steel Co., New Haven, Conn., to fill the vacancy caused by the death of former Senator Charles A. Porter.

Chas. H. Daker, for the past year with the Pittsburg office of Hickman-Williams & Co., has severed his connection with that concern to become associated with the Iron City Steel Co., 615 Bessemer Bldg., Pittsburg.

G. P. Bassett Jr., Commonwealth building, Pittsburg, has secured the exclusive sales agency in the Pittsburg district for the Upson Nut Co., Cleveland, and the River Furnace, Cleveland, making the Upson, Scotch and Sampson brands of pig iron.

David Hunt Jr., general sales manager of the The Warner & Swasey Co., Cleveland, O., sailed Feb. 29 for a three months' trip abroad. He will visit England and the continent.

William Lodge, of the Lodge & Shipley Machine Tool Co., of Cincinnati, has returned from an extended eastern trip, including Canadian cities. While in the east he visited the officials of the Brooklyn navy yard with a view to securing a contract from the government for the manufacture of steel ammunition projectiles.

Will Return Applications.—R. B. Higbee announces that owing to the lack of support given to the company which he has been seeking to promote for the development of his mining property near Chisholm he has decided to return all applications for stock, and will demonstrate the correctness of his estimate as to the value of the property by development through private enterprise.

THE BALL ENGINE WORKS AT ERIE, PA.

About three years ago the Ball Engine Co. of Erie, Pa., erected a new machine and erecting shop. Last year, it made considerable additions to the plant, building a new foundry of about 20-tons capacity per day, a new pattern shop and a pattern storage building. The plant, as at present arranged, consists of two main buildings, the foundry and machine shop, built parallel to one another and connected by a covered passageway through which a traveling crane runs, providing convenient means for the transfer of castings from the foundry to the machine shop. Provision has been made for the enlargement of the plant by the extension of these buildings along their longitudinal axis, giving an H-shaped arrangement instead of the present U-shaped one and by widening the side bays of the machine shop. Reference to accompanying plan will show the relation of the present buildings and the provision for extension.

The Foundry.

The foundry, which has a capacity of about 20 tons per day, is a building 150 x 185 feet 9 inches. It comprises one central and two side bays with a low peaked roof. The center bay is served by a 60-foot span 25-ton Pawling & Harnischfeger electric traveling crane with 5-ton auxiliary and two jib cranes of 22-foot radius and equipped with electric hoists, which are suspended from columns along the center bay. A 3-ton Sprague electric hoist is installed in one of the side bays, having a travel transversely of the bay. Provision has been made for the further increase of crane capacity, as needed, by the installation of similar hoists in both side bays and by the installation of jib cranes on the remaining columns of the center bay. The runways for the additional hoists were placed in position when the foundry was built.

The molding is principally floor work, most of the castings being of considerable bulk and many of them large. No machines are used, although their adoption for manufacturing certain duplicate parts is under consideration. Two large core ovens fitted with rolling steel shutter doors are installed in the extension of the foundry on the west side, and in addition, there are nine smaller core ovens adjoining the large ones. The large ovens have tracks laid in them to take cars for large cores or dry sand molds. All ovens are coke-fired.

FIG. 1—INTERIOR OF FOUNDRY.

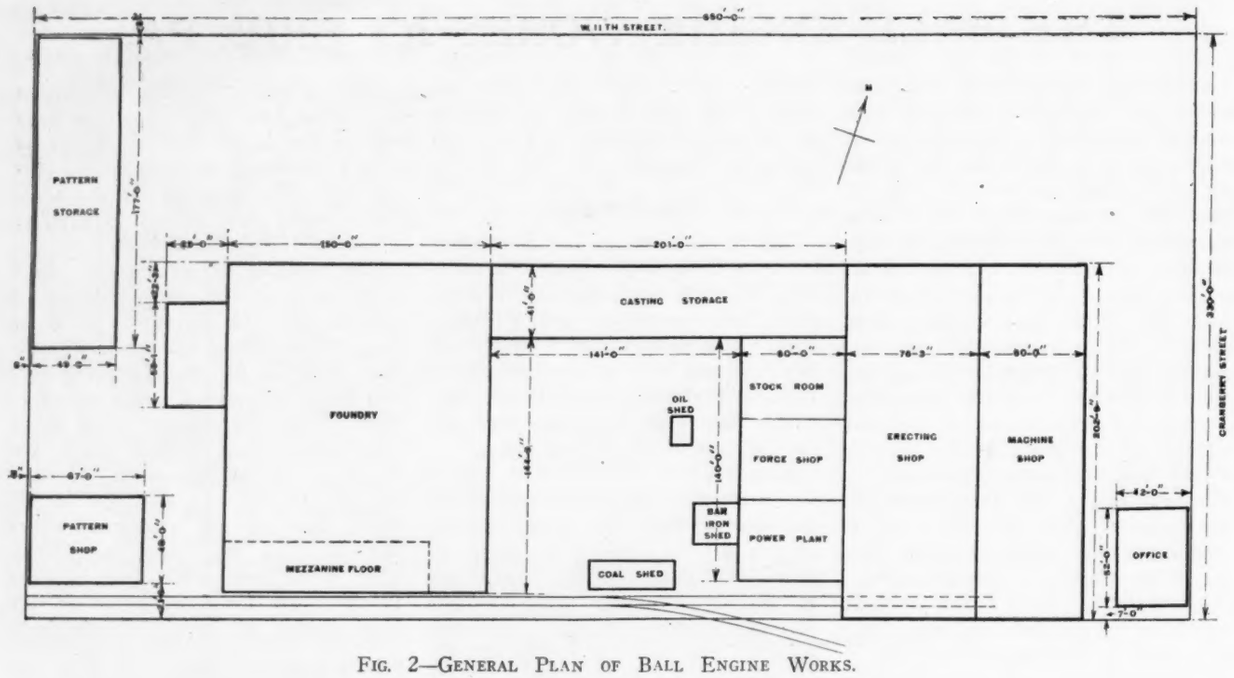


FIG. 2—GENERAL PLAN OF BALL ENGINE WORKS.

The melting equipment comprises a No. 8 Whiting cupola, blast for which is furnished by an American Blower Co.'s cupola blower, driven by a steam turbine built by the Ball Engine Co.

The pig iron storage and coke storage form an unusual feature of this foundry. A mezzanine floor has been built at one end behind the cupola having a width of about 30 feet and extending almost entirely across the south end of the building. Pig iron and coke are stored on this floor which is traversed by a 3,000-pound Pawling & Harnischfeger electric crane. The floor does not extend quite to the east wall of the building. The craneway, however, does extend over the open space and iron, coke and other materials are elevated by the crane to the charging floor. This mezzanine floor is at the proper level for charging the cupola and a minimum of handling of material is required. The sand storage is in bins built under the mezzanine floor. The switch track serving the plant extends across the south wall of the foundry and sand may be shoveled directly from the cars into the bins, and iron and coke may be dumped into the open space at the end of the mezzanine floor, whence they are elevated by the crane.

A motor-driven tumbling barrel is installed at the entrance of the passageway connecting the foundry and machine shop. A motor-driven exhaust fan removes all dust from the barrel. Castings are weighed on a portable scale suspended from the crane.

FIG. 3—MEZZANINE FLOOR IN FOUNDRY.

Machine and Erecting Shops.

The erecting and machine shops, together with the blacksmith shop, power plant and stock room, occupy a building 202 feet 9 inches by 196 feet 3 inches. This building comprises a central bay with a peaked roof and one-story extension on either side of it provided with saw tooth roofs. The central portion is practically all used for erection and testing purposes, machine tools being installed only along one edge of it and these being of the heavier type, which require the service of the large crane. This portion of the building is spanned by a 70-foot 25-ton Pawling & Harnischfeger crane fitted with a 5-ton auxiliary hoist.

In the bay devoted to machine tools are installed the lighter tools in groups, similar tools being situated together. A bank of lathes set at right angles to the axis of the shop extends along the outer wall for about half the length of the shop. Opposite them and just inside the row of columns dividing the machine section from the erection floor are grouped the drill presses and turret

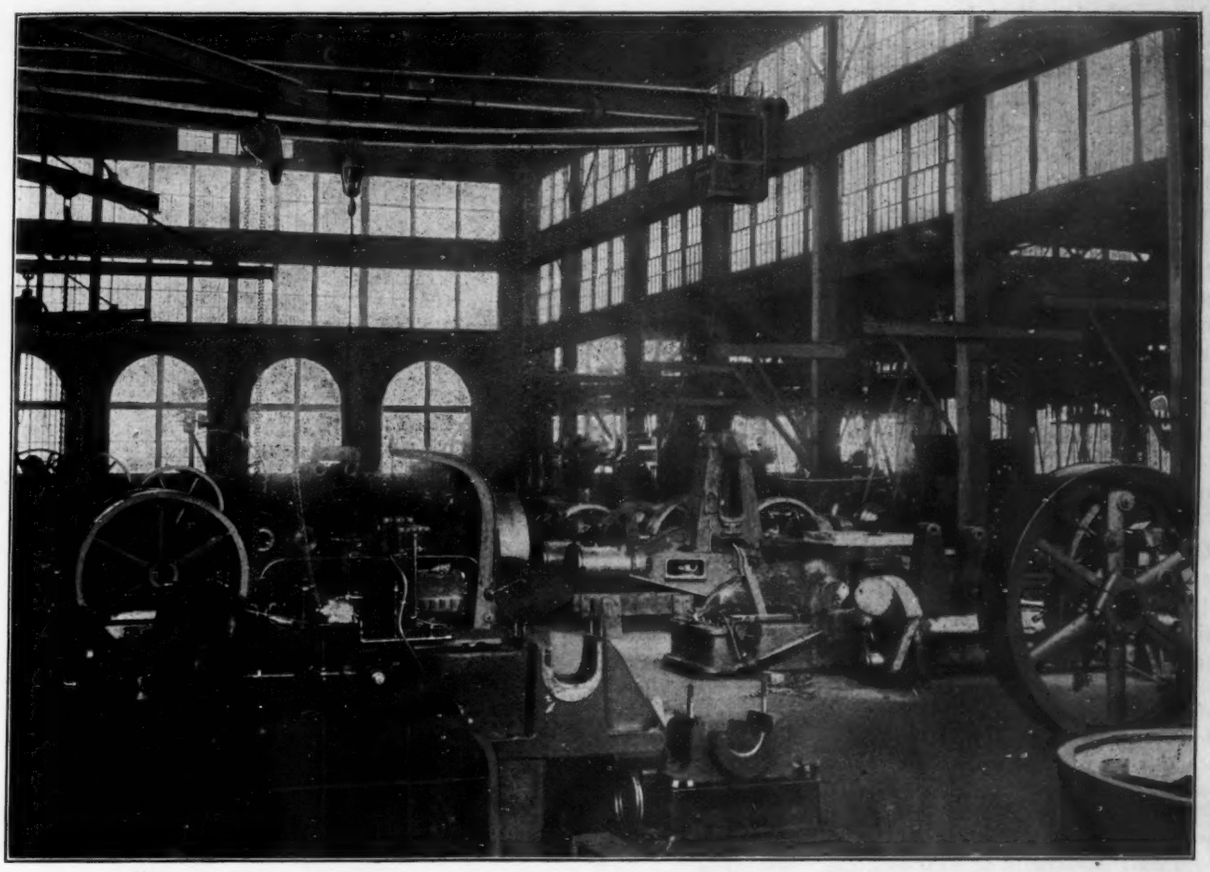


FIG. 4—GENERAL VIEW OF ERECTING SHOP.

lathes, together with shapers and light planers. A pair of duplex and a pair of plain milling machines complete the equipment of this portion of the shop.

The space under the next saw tooth, and for a short distance at either side of it, is reserved for fitting work. Square benches about 8 feet on a side are situated at various points in this space, a vise being placed on diagonally opposite corners of the benches. As ample light is provided for all portions of the floor by the saw tooth roof, there is no necessity for placing these benches against the wall, as is the usual custom. The heavy lathes are situated directly north of the fitting space and beyond them is the heavy planing and boring department. Three planers placed parallel with the axis of the building are situated side by side, together with a slotter. Facing them, so as to form a passageway between the two, is a group of three boring mills, together with a Bullard vertical turret lathe.

The south end of this portion of the building is devoted to the tool room and shop office. The usual racks for tool storage are provided in the tool room, together with a complete equipment of lathes, milling machines, etc., for the manufacture and repair of tools. A gas-fired muffle furnace is installed wherein tools are heated for tempering. Grinding machinery is installed for the grinding of all tools used in the shop.

Along the edge of the central bay is a large Betts boring mill with an auxiliary rail extending at right angles from the main cross rail. Two heavy

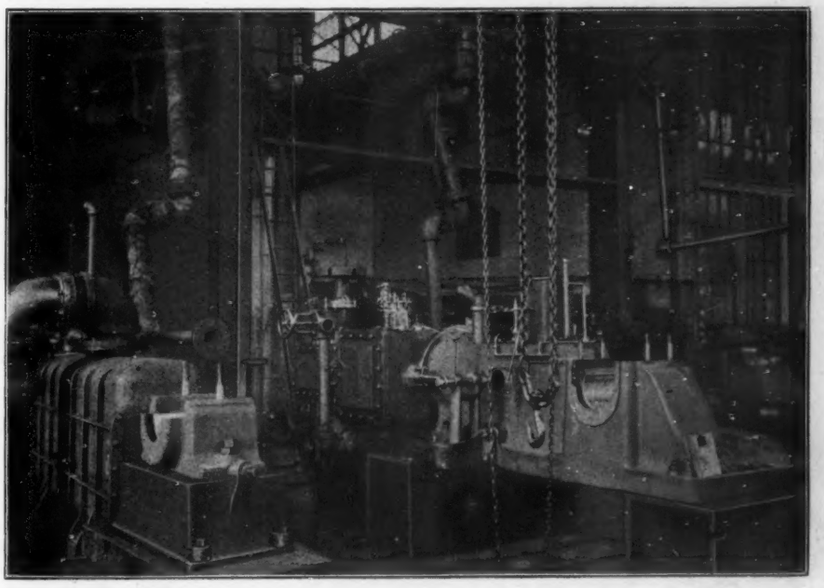


FIG. 5—ENGINE BEING SET UP ON TEST BLOCK FOR TESTING.

planers are also situated on one edge of the erecting space, one of them having a widened housing to permit the machining of large castings. A Pedrick & Ayer open side shaper is placed alongside of the planers and three radial drills of varying sizes complete the equipment installed along this edge of the erecting space. A horizontal cylinder boring machine is installed across the end of the erecting space and is used for boring out the cylinders of the larger engines.

In most cases, the driving of machinery is accomplished on the group system. The larger tools, however, such as the heavier lathes, the large planers and the large Betts boring mill are driven by individual motors. The open side shaper above mentioned is used for planing out the seat for the main bearings of the engine, a pit being provided alongside of it to permit the engine frame to be placed conveniently for machining. The use of the turret lathe has been highly developed, it being used for the manufacture of a great many steel small parts of the engine.

With the exception of the machinery above noted and the testing block occupying a space of 16 x 32 feet, the erecting floor is entirely clear and available for the purpose for which it is designed.

The saw tooth building on the opposite side of the erecting floor from the machine shop contains the power plant and locker room for the men, stock room and forge shop. The forge shop is small in proportion to the rest of the plant, as all the larger forgings are made outside. It, however, has an equipment of four forges and two steam hammers.

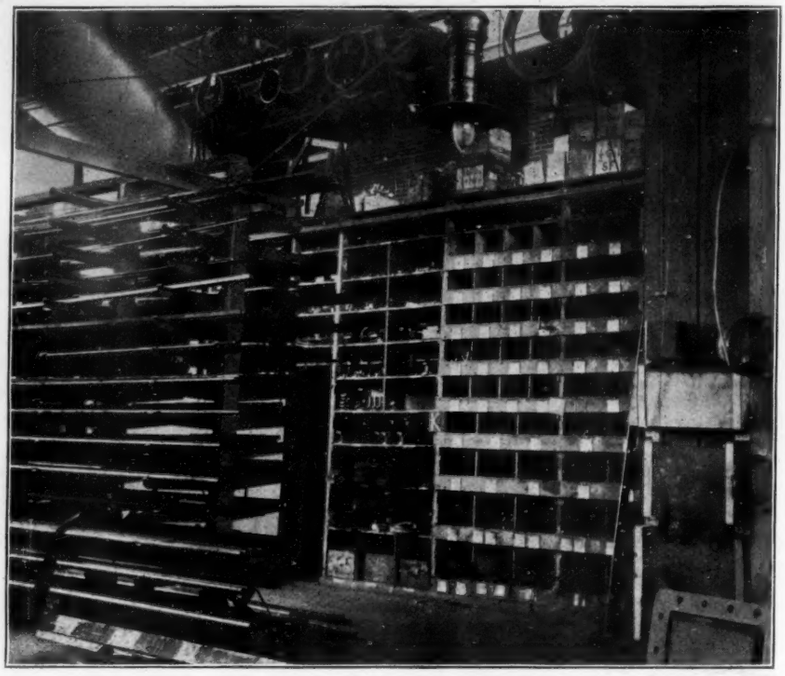


FIG. 6—A CORNER OF STOCK ROOM.

Stockroom System.

The stockroom, which is shown in Fig. 6, issues all partially assembled material for the manufacture of engines which it has in stock, together with all small parts, bar stock, etc. Four power hack saws are installed for cutting bar stock to lengths, as required by the shop. All cutting is done in the stock room. The small standard parts of engines are manufactured in lots and kept in the stock room and issued as required. It is the aim of the company to keep an adequate supply of these parts on hand at all times and to this end a maximum and minimum number has been decided on for each part between which numbers the stockkeeper must keep his supply. The procedure followed in issuing stock for the manufacture of an engine comprises the sending to the shop of a "classification" sheet, on which is printed the names of all parts entering into the manufacture of an engine. The list of parts has a column set alongside of it in which appropriate symbols are entered, which show the exact state of the work. Thus, there is a different symbol for rough work, partly finished work and finished work. The "classification" sheet is sent to the stockroom and all standard parts which are finished and are in stock are issued to the shop and the symbol denoting finished work is placed opposite the names of these parts on the "classification" sheet. When the foundry makes the castings called for, the symbol denoting "rough work" is entered. When these enter the machine shop, finishing work is started, and then the symbol denoting "partly finished" is entered. As soon as the machine work is completed, the "partly finished" symbol is changed to "finished"

FIG. 7—PASSAGEWAY BETWEEN FOUNDRY AND MACHINE SHOPS FOR CASTING STORAGE.

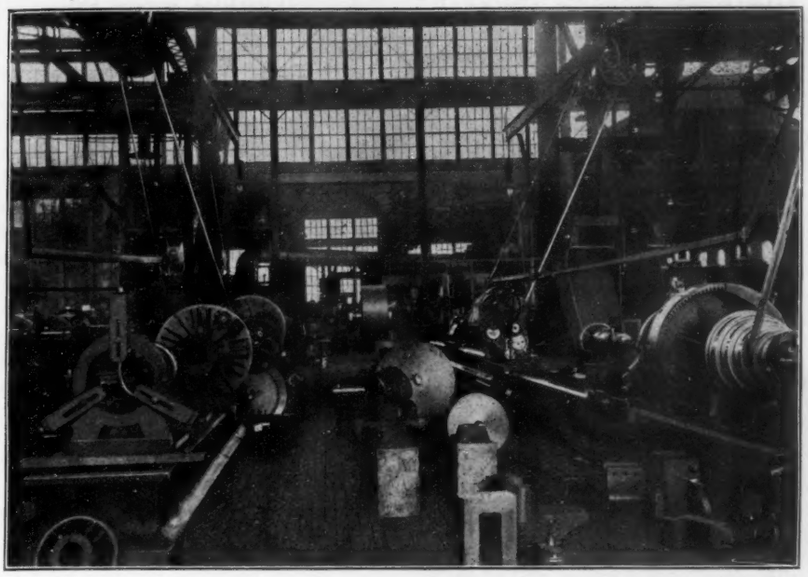


FIG. 8—HEAVY LATHE SECTION OF MACHINE SHOP, SHOWING 3-TON CRANE RUNWAY EXTENDING INTO ERECTING SPACE TO HANDLE MATERIAL FROM LARGE CRANE. ALSO SHOWS POSITION OF VENTILATING DUCTS.

symbol and the piece is then sent to the erecting floor. Thus, a glance at the "classification" sheet shows at any time the exact status of an order going through the shop.

The drawings issued to the shops are prepared not only to convey to the workman the desired idea, but also to facilitate the keeping of costs. Thus each separate part shown on a drawing is boldly marked with a letter—the workman in turning in his time gives the operation—the number of the drawing and the letter—thus identifying the part upon which the work was done. Certain pieces, as screws, studs, etc., have no individual time turned in on them, and they are marked on the drawings with a double letter as AA.

Power Plant.

The power plant is situated at the south end of the west saw tooth bay of the main building and comprises two 150-horsepower Babcock & Wilcox boilers and two Ball tandem compound engines direct-connected to a 75 and a 100-kilowatt, 250-volt generator, respectively. A Bury two-stage air compressor 14 x 9 x 8 inches and belt-driven supplies compressed air to the various departments of the shop in which it is needed.

The testing block comprises a slotted floor plate on which the engines can be mounted for tests. A complete equipment of surface condensers, Prony brakes, etc., is provided for obtaining the steam consumption and horsepower of the engine.

Transportation Facilities.

The transportation facilities provided are unusually complete. All transportation is effected by means of cranes and electric hoists, there being no industrial railways installed. The crane equipment of the foundry has already been commented on. The covered passageway connecting the foundry with the machine shop is, as has already been stated, equipped with a 15-ton Niles crane. This passageway is used for the storage of castings and the craneway serving it projects a few feet into both the foundry and machine shop. This enables castings to be deposited under or picked up by either of the main cranes in those buildings directly from the crane in the passageway. The machine shop has three 3-ton Pawling & Harnischfeger cranes controlled from the floor extending under the saw tooths and running transversely of the building. The runways of these cranes project out into the main bay, enabling them to receive or deliver material to or from the 25-ton crane with a minimum of handling. These three hoists are arranged to serve the planer and boring mill department, the heavy lathes and the fitting space. Railroad service is provided by a switch track from the Bessemer & Lake Erie railroad, which runs along the front of the plant and extends into the south end of the machine shop for shipping purposes.

Pattern Shop.

The pattern shop is a building 67 x 49 feet and contains the usual equipment of wood working tools. It is amply large to provide storage space for the pattern lumber, which is thus seasoned under cover. The pattern storage has three floors and is 177 x 49 feet. It is of brick, slow burning construction and provided with automatic sprinklers on the dry pipe system, a sprinkler head being placed

FIG. 9—LARGE BORING MILL IN MACHINE SHOP.

every 6 feet. The windows are all provided with iron shutters.

Heating System.

The heating system of the pattern shop is by direct steam radiators. In the machine shop and foundry hot air is used, which is warmed by exhaust steam and forced through the buildings by a Link Machine Co.'s 120-inch fan. The arrangement of ducts is unusual, these being placed below the floor and built of concrete.

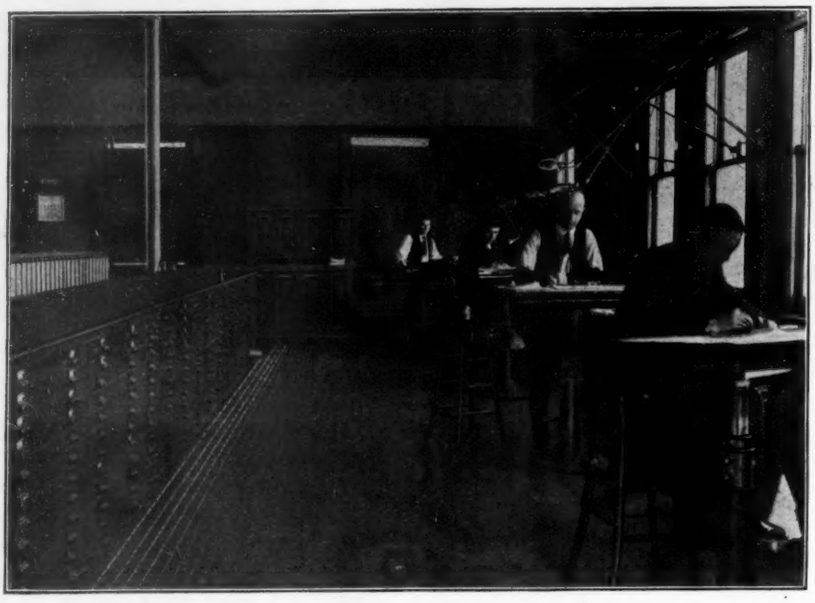


FIG. 10—DRAFTING ROOM.

At appropriate intervals, vertical galvanized iron ducts are taken off from the concrete ones and deliver the air at an elevation of 7 feet above the floor. This arrangement eliminates unsightly pipes from overhead and provides entire freedom for the operation of the cranes.

The office building is a two-story brick structure, containing the general offices on the lower floor and a commodious and well lighted drafting room on the upper floor. The square portion of this room contains cases for the filing of drawings, the drafting tables being placed alongside the windows on three sides of the building. These tables are mounted on standards and can be swiveled to take any position desired by the draftsman. An electric blue printing machine forms part of the equipment of this department.

The officers of the Ball Engine Co. are: President, James McBrier; vice-president, D. N. McBrier; secretary, F. B. McBrier; treasurer, A. W. Milne; engineer, E. J. Armstrong.

THE NAIL MAKING INDUSTRY.

BY MILES A. HARRIS.

Many costly and ingenious nail machines have been made and tried which were designed to make more than one nail at a stroke. It may be possible to attain this ideal but, in the opinion of many authorities on this subject, much money and a few more years will be used to accomplish this end. Numerous patentable ideas are presented to the patent office with a view to the making of nails cheaper than it has been done, but to date none has showed the efficiency demanded by the present day builders. These men, large building contractors and others, demand a nail that is of uniform length, the heads are required to be round, and the temper of the wire must be uniform to stand the continued blows of the workman driving in hard wood. However massive and intricate the experimenter's design has been made, some defect in one or more of the above named particulars has been manifest in the finished product, and the machine abandoned. Made singly by the much used German machine, the maximum efficiency is between 200 and 300 per minute on small nails and tacks. Larger nails, etc., up to the 5/8-inch square steel railroad spikes, decrease in rapidity of production to less than 30 per minute.

The weight of a column of water one inch square and one foot high is approximately 0.434 pound.

AN UNUSUALLY LONG CASTING FOR AN OPEN SIDE PLANER BED.

The accompanying illustrations show a new open side planer recently built by the Cleveland Planer Works, Cleveland, which is noteworthy for the fact that it has a bed which is probably the longest machine tool casting ever made. The bed was cast in one piece, the object being not only to test the capacity of the foundry, but to demonstrate the amount of vertical curvature necessary in the mold to insure a straight bed when the casting had cooled, with an iron of a certain analysis. The calculations were so nearly correct, that when cold and supported in a neutral position, the bed was straight within ¼ of an inch vertically, and ⅛ of an inch horizontally. That this is extremely accurate work can be seen when the length of the bed is considered. The casting is 52 feet long, 45 inches wide and 27 inches high. It was cast closed on the upper side with the exception of an opening for the bull wheel, and closed on the lower side for that portion opposite the column base and a distance of about 6 feet in either direction with holes only large enough to permit the easy removal of the cores. The thickness of metal in the walls is 1½ inches. Cross partitions were provided each 1¾ inches thick, spaced about 30 inches. The casting weighed approximately 52,000 pounds and was practically without a blemish, and sufficiently hard to provide a good wearing surface in the slides.

The method of molding this casting is of interest. A short section of pattern was used in comparison to the length of the finished casting, being about 12 feet in length. The mold was made top side down, and the Vs were first molded by means of a separate short pattern. One end of this pattern was pounded down into the sand the requisite distance to provide the calculated curvature in the mold necessary to produce a straight finished casting. The V pattern was then withdrawn and the main pattern placed in position on the Vs of the mold and the finished mold built up around it. This operation was repeated the necessary number of times until a mold of the requisite length was produced. The same method is followed in molding shorter beds ranging from 15 to 30 feet in length, and the same proportion of accuracy has been obtained.

The plate shown on the table of the machine in process of machining is a floor plate boring mill base and was true when cast within ¼ of an inch in every direction. It weighs approximately 22,000 pounds and is 12 feet square by 9 inches

deep, and thoroughly ribbed and braced. A casting of this character would have required an extremely large planer to machine, had not an open side planer been available. The planer illustrated is a 60-inch machine widened out to 72 inches. It allowed the work to overhang the platen on the column side about 8 inches. The table being 54 inches wide, the plate was balanced on the platen within about two tons.

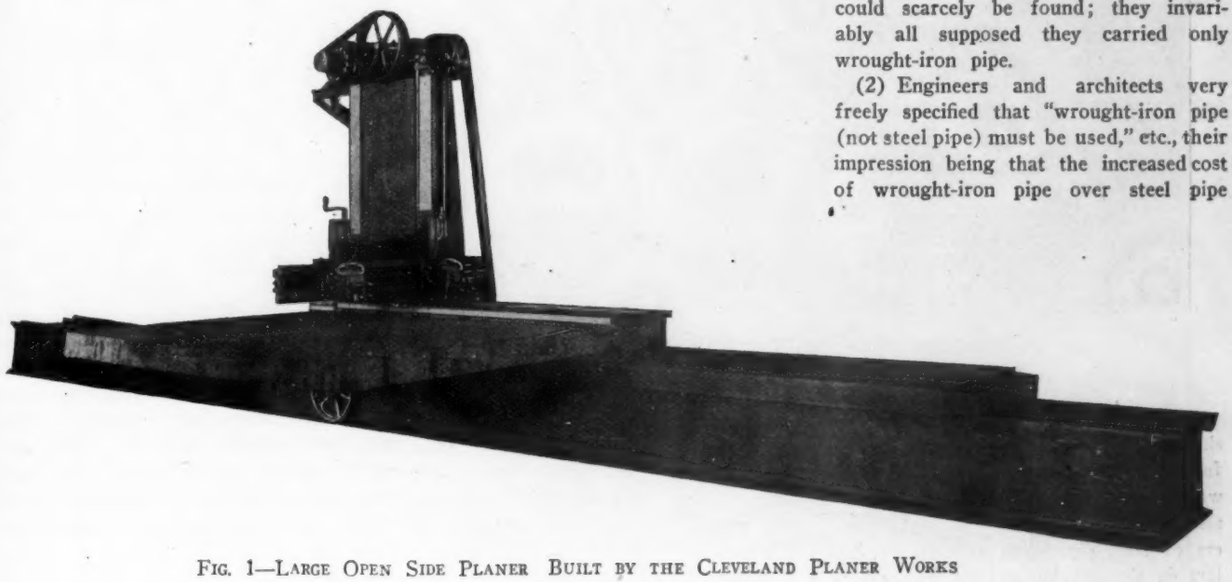


FIG. 1—LARGE OPEN SIDE PLANER BUILT BY THE CLEVELAND PLANER WORKS

The planer table is 31 feet long with Vs spaced at 36 inches center to center. The rack is 2½ pitch with 8-inch face. All gears and rack are of steel. The ratio of cutting to return speed is about 2¾ : 1 with belt speeds of 1,600 and 4,400 feet per minute respectively for 25 feet per minute table travel. The motor is of the induction type rated at 20 horsepower. The column is 60 inches wide and 30 inches deep at the lower side. It is fastened to the base with twenty 1½-inch bolts and doweled with four ¾-inch pins. The base to which the column is bolted is cast integral with the bed up to the level of the Vs.

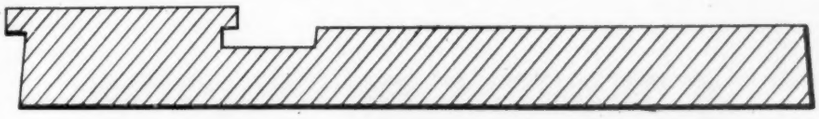


FIG. 2—SECTION OF BORING MILL BED PLATE SHOWN ON MACHINE IN FIG. 1.

The castings described above were made for the Cleveland Planer Works by the Johnson & Jennings Foundry Co., Cleveland, under the direction of Charles A. Olsen, superintendent.

RELATIVE CORROSION OF WROUGHT IRON AND SOFT STEEL PIPES[1]

By T. N. THOMPSON.

An investigation along practical lines, at the instance of pipe manufacturers, as to the relative life of wrought iron and steel pipe in heating and plumbing conditions developed the following peculiar conditions of affairs:

(1) A large proportion of the members of the heating trade denounced steel pipe, because, as they said, "It splits, breaks the teeth of the dies and rusts out too quick." Contractors who would acknowledge that they carried steel pipe on stock a few years ago could scarcely be found; they invariably all supposed they carried only wrought-iron pipe.

(2) Engineers and architects very freely specified that "wrought-iron pipe (not steel pipe) must be used," etc., their impression being that the increased cost of wrought-iron pipe over steel pipe was more than compensated for in the greater period of usefulness of the wrought-iron pipe over the steel pipe.

(3) Instructors in trade schools, professors in colleges, and even the writers of text books were known to emphasize the supposed fact that steel pipe was not as durable as wrought-iron pipe and that the latter should be used in preference to the former, particularly for underground work.

[1]Abstract of a paper read at the January, 1908, meeting of the American Society of Heating and Ventilating Engineers.

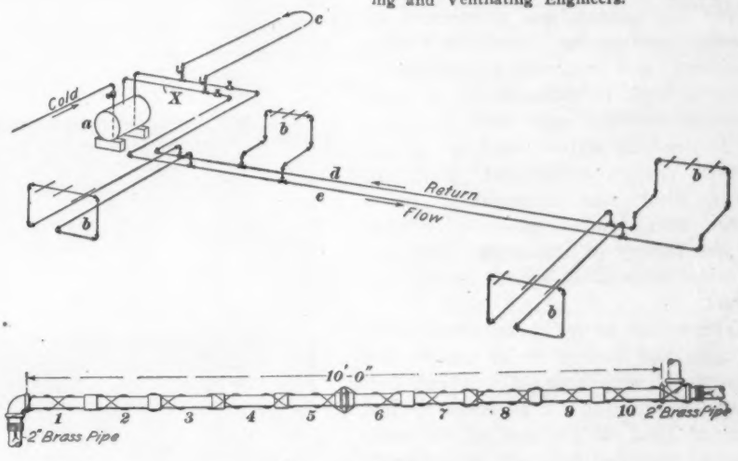


FIG. 1—ARRANGEMENT OF TEST PIPES—LOWER ILLUSTRATION SHOWS WIRING TO PREVENT ELECTROLYTIC ACTION.

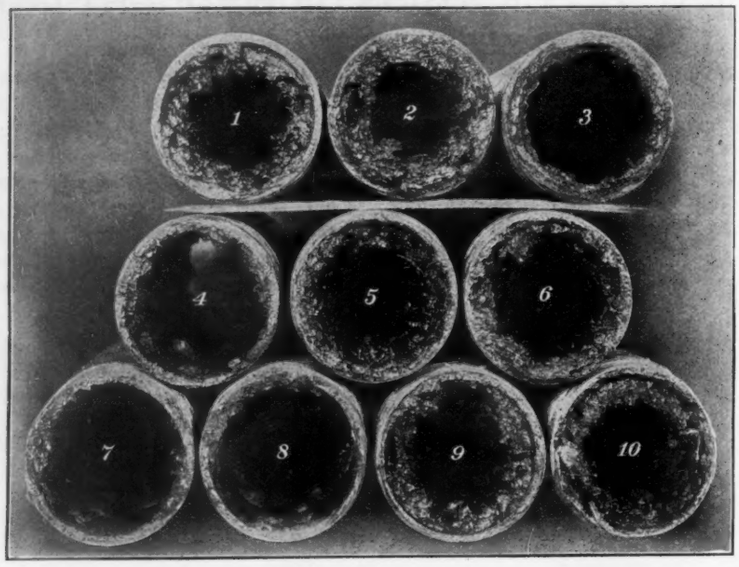


FIG. 2—RUST FORMATION AND THICKNESS IN TEST PIPES.

(4) On the other hand, statistics showed that the makers of steel pipe furnished about 80 per cent of all the welded pipe then used in America. I also found that not only had the makers of steel pipe spent millions of dollars in the development of vast plants, but that they had also made a large number of experiments and tests to determine the relative durability of wrought-iron and steel pipes, and that their findings were invariably to the effect that the life of these two materials is about the same when they are subject to equal conditions.

(5) Wrought-iron pipe and steel pipe resemble each other so closely that many engineers, contractors, architects, and even steamfitters themselves, cannot distinguish a difference.

Method of Investigation.

The investigation was commenced by quietly circularizing about 300 heating engineers and contractors, offering a book to each in exchange for a small piece of corroded pipe which had been in service only a few years, we to pay express charges at our end. Each circular letter was accompanied by a sheet with printed questions relating to the history of the sample, and was provided with blank spaces for the answers.

The object in trying to obtain these samples and their histories was to find how many were wrought iron and how many were steel. I expected to find that at least 80 per cent of the samples of corroded pipe sent to me would be steel, but they were not. Of the samples received only 10 gave out within four years of service, six of these being steel and four being wrought-iron. An examination of these samples showed that uniform corrosion took place in both the wrought-iron and the steel pipes. An excellent example of uniform corrosion of a ⅜-inch black wrought-iron underground cold-water pipe came from Chicago. It had been in use three years; fully half of the metal was "eaten off" the outside, while the inside was but slightly corroded. There was no pitting present in this sample.

Another good example of uniform corrosion was exhibited in a piece of 1½-inch black wrought-iron exhaust pipe from power boilers in Tonawanda, N. Y. This had lain in damp soil and ashes for four years before giving out. The thickness of this pipe varied from about one-half the original thickness to tissue paper thickness, but no pitting was present. The corrosion was chiefly external, and no doubt was due to the moisture and the ashes. But a better example of uniform corrosion was found in a piece of 2-inch steel pipe from Boston. The pipe was used as a wet return for a direct-radiation low pressure heating system, the pressure never exceeding 3 pounds. This pipe was put in February, 1904, and was removed March, 1905. The pipe was run on top of a cement floor over which was a plank floor on which coal

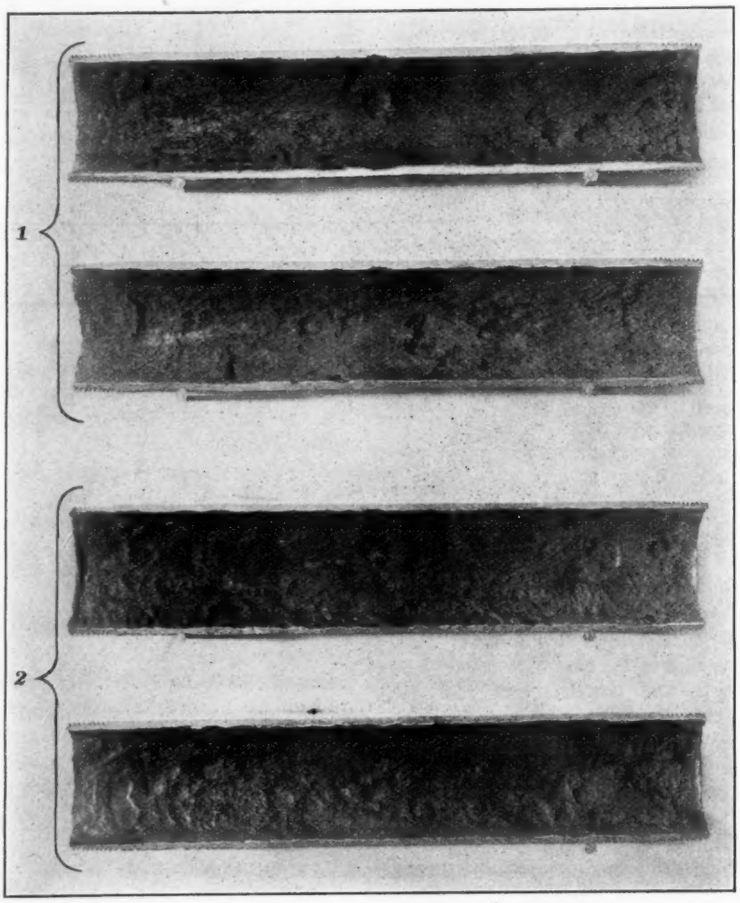


FIG. 3—PITTING IN PIPES NO. 1 AND NO. 2.

was stored. Some of this coal worked down through the wood floor so that the pipe was partially buried in coal. After each heavy rain some surface water would leak through into the coal bin, so that it is probable the coal around the pipe was continually moist. The pipe was not covered with pipe covering. The corrosion was all external. The inner surface was not corroded in the least.

Three galvanized nipples were received from one party in Newark, N. J. They were reported to have been all taken from the same pipe line, which was used for hot-water circulation between a tank and a heater for a house supply of hot water. Two of these nipples were wrought iron and one was steel. They were all pitted to about the same extent.

A study of the samples received from the trade would lead to the assumption that (1) both wrought-iron and steel pipes which convey steam or hot water will corrode very rapidly when buried underground in wet or damp soil or ashes, the corrosion being principally external; (2) both wrought-iron and steel pipes which convey hot water become rapidly corroded if the air and other gases naturally solvent in the water are not permitted to escape from the water previous to its passage through the pipes, as in feed-water heater connections and hot-water circulation pipes for plumbing purposes, this corrosion being principally internal if the pipes are not buried underground. (3) That the life of either wrought-iron or steel pipes subject to both of the aforesaid conditions will be much shorter than if the pipes are subject to only one of them, because the metal will thus become rapidly corroded at both the internal and external surfaces. (4) It is not a fact that the destruction of wrought-iron pipes is in the form of a uniform corrosion, while the destruction of steel pipes is in the form of pitting; they appear to be on an average nearly alike, with the difference, if any, in favor of steel.

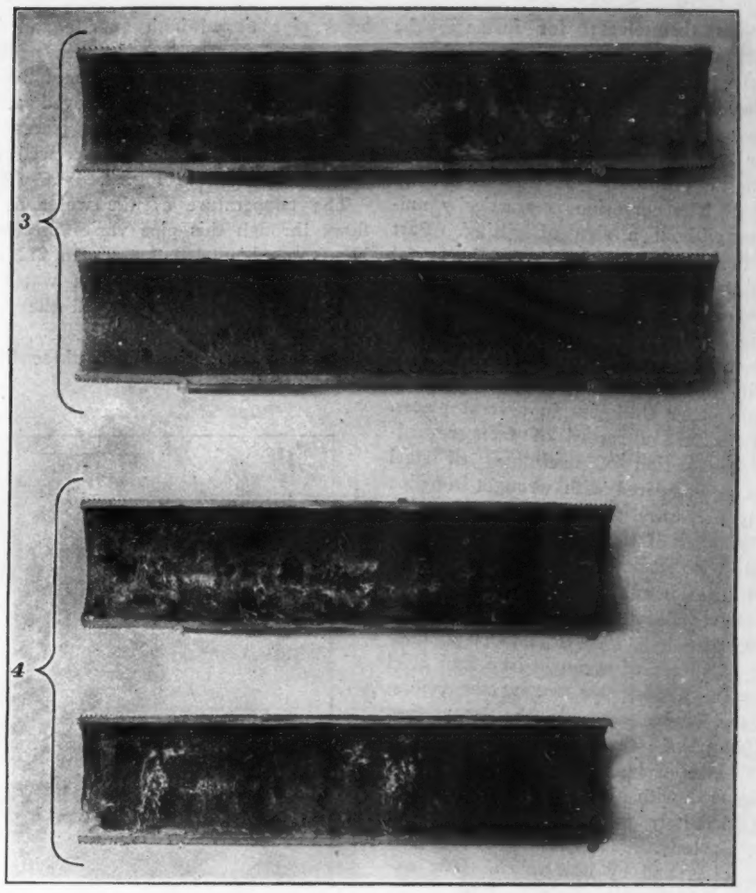


FIG. 4—PITTING IN PIPES NO. 3 AND NO. 4.

Of course no definite conclusion can be drawn from the study of a number of pieces of corroded pipes received from different parts of the country further than the facts we can see in the

Table I.

	No. 1.		No. 2.		No. 3.		No. 4.		No. 5.		No. 6.		No. 7.		No. 8.		No. 9.		No. 10.	
Kind of Pipe.	Blk. W. Iron.		Blk. Steel.		Galv. W. Iron.		Galv. Steel.		Blk. W. Iron.		Blk. Steel.		Galv. W. Iron.		Galv. Steel.		Blk. W. Iron.		Blk. Steel.	
Weight without coupling when put in.....	$3\frac{13}{64}$ lb		$3\frac{3}{32}$ lb		$3\frac{15}{32}$ lb		$2\frac{25}{32}$ lb		$3\frac{3}{32}$ lb		$3\frac{5}{32}$ lb		$3\frac{10}{32}$ lb		$3\frac{18}{32}$ lb		$3\frac{7}{64}$ lb		$3\frac{3}{32}$ lb	
Weight without coupling when removed and rust washed out.....	$2\frac{26}{32}$ lb		$2\frac{20\frac{1}{4}}{32}$ lb		$3\frac{13}{32}$ lb		$2\frac{23}{32}$ lb		$2\frac{20\frac{1}{4}}{32}$ lb		$2\frac{19}{32}$ lb		$3\frac{6}{32}$ lb		$3\frac{15\frac{1}{2}}{32}$ lb		$2\frac{21\frac{1}{4}}{32}$ lb		$2\frac{18}{32}$ lb	
Loss in weight by corrosion.....	$6\frac{1}{4}$ oz.		$7\frac{3}{8}$ oz.		1 oz.		1 oz.		$7\frac{3}{8}$ oz.		9 oz.		2 oz.		$1\frac{1}{4}$ oz.		$7\frac{1}{8}$ oz.		$8\frac{1}{2}$ oz.	
Per cent loss.....	12.2%		14.9%		1.8%		2.2%		14.9%		17.8%		3.8%		2.2%		14.3%		17.2%	
	1	1X	2	2X	3	3X	4	4X	5	5X	6	6X	7	7X	8	8X	9	9X	10	10X
Depth of five deepest pits in each half of each sample in inches.	.078	.060	.056	.061	.048	.030	.055	.092	.073	.057	.053	.065	.048	.050	.049	.041	.045	.062	.051	.056
	.078	.083	.045	.069	.043	.042	.044	.082	.072	.045	.046	.073	.059	.027	.031	.040	.044	.066	.037	.052
	.072	.074	.068	.071	.038	.049	.045	.068	.062	.062	.063	.053	.055	.060	.042	.025	.057	.075	.043	.066
	.080	.076	.069	.063	.029	.023	.038	.070	.073	.058	.033	.053	.070	.074	.026	.048	.069	.054	.041	.067
	.072	.059	.069	.075	.029	.016	.058	.050	.050	.056	.042	.065	.049	.068	.041	.046	.042	.050	.062	.045
	1	1X	2	2X	3	3X	4	4X	5	5X	6	6X	7	7X	8	8X	9	9X	10	10X
Thickness of metal under pits in inches.....	.076	.094	.098	.093	.106	.124	.099	.062	.081	.097	.101	.089	.106	.104	.105	.113	.109	.092	.103	.098
	.076	.071	.109	.085	.111	.112	.110	.072	.082	.109	.108	.081	.095	.127	.123	.114	.110	.088	.117	.102
	.082	.080	.086	.083	.116	.105	.109	.086	.092	.092	.091	.101	.099	.094	.112	.129	.097	.079	.111	.088
	.074	.078	.085	.091	.125	.131	.116	.084	.081	.096	.121	.101	.084	.080	.128	.106	.085	.100	.113	.087
	.082	.095	.085	.079	.125	.138	.096	.104	.104	.098	.112	.089	.105	.086	.113	.108	.112	.104	.092	.109

samples themselves; for instance, the finest sample of uniform corrosion I received was mild steel. It came from Milwaukee, Wis., is ¾-inch black steel pipe and is reported to have been used "for heating water in a range boiler for domestic purposes." It was in use two years. The corrosion is practically uniform without a sign of pitting. Part of the original thickness of the metal was corroded from the inside and about two-thirds from the outside. The pipe, which, no doubt, was originally standard weight, is now about 1/16-inch thick at its thickest part and tapers down to tissue paper thickness in several places.

To secure a record of facts regarding the period of usefulness of steel pipe as compared with wrought-iron pipe it is necessary to test a large number of samples of both steel and iron pipes subject to exactly the same conditions, and these conditions must be the same as the conditions of practice.

On March 7, 1906, I installed a number of pieces of wrought-iron and steel pipe for a corrosion test at the ceiling of the engine room in the Instruction building of the International Correspondence Schools in Scranton, Pa. (Fig. 1), with the object of determining definitely whether steel pipe will last as long, or longer, than wrought-iron pipe, and by how much. The existing conditions were as follows:

A 100-gallon galvanized iron boiler *a* in the engine room is set horizontally on two cast-iron cradles supported on brick piers. This boiler furnishes hot water to 24 combination cocks at four press room sinks as at *b* and four slop sinks *c*. The water is heated by a 1-inch brass steam coil inside the boiler. The water comes from the city mains and has a working pressure varying from 85 pounds to 135 pounds per square inch by the gage. An analysis of the city water made while the pipes were under test was as follows:

Table II—Analysis of Water.

	Parts per Million.
CO_2 and Organic matter	29.33
Silica	4.00
Iron oxide	0.43
Alumina	0.37
Calcium carbonate	4.82
Magnesium	Trace
Sulphur trioxide	Trace
Sodium chloride	0.82

This may be classed as ordinary good water and should not affect iron or steel pipes in any extraordinary way.

The water on being heated in the boiler *a* circulates between the boiler and the sink cocks to insure hot water being drawn instantly when a cock is opened. The circulation is from the top of the boiler up through the flow pipe *d* and back through the return pipe *e* to become reheated in the boiler. These pipe lines are all composed of annealed brass pipe tinned both outside and inside and connected with heavy cast brass beaded fittings. A piece of 2-inch pipe 10 feet long was removed at *x* and replaced with 10 short pieces of 2-inch iron and steel pipe screwed together as shown in Fig. 2.

The temperature of the water as it flows through this pipe varies presumably from about 160 degrees to 212 degrees, and the supply of hot water is maintained day and night all the year around.

Owing to the fact that these iron samples were connected to brass pipes, and also because a large number of presses and other printing and bookbinding machinery driven by individual electric motors are used in this building, we wired and cross-wired the pipes with copper wire as shown, connecting the ends with perfect contacts to the brass pipes at *g* and *h*. This was done under advice from electrical experts to carry any stray current around the samples and thus avoid decomposition due to electrolytic action. It was thought this precaution would insure a corrosion that would be due to nothing but the ordinary action of the hot water on each sample, and that no sample would be favored in any way. The samples were installed March 7, 1906; were removed March 14, 1907, and were in constant service during that time.

As soon as they were removed and separated, the ends were photographed (see Fig. 2) to show the rust formation and its thickness. The velocity of the water through the samples was always low; it never was high enough to wash out or dislodge the rust, which, therefore, formed a fairly uniform lining about 3/16-inch thick in the black samples. The galvanized samples were not affected this way; they corroded only in spots which presumably were imperfections in the galvanizing.

Before installing the samples we weighed each one separately without the couplings, so that after the rust was all washed out and the samples weighed again the difference in weight indicated the total weight of the metal lost by corrosion. Here we found that in the plain pipes 9 13/32 pounds of wrought-iron lost 20¾ ounces, while 9 11/32 pounds of steel lost 24⅞ ounces. (The

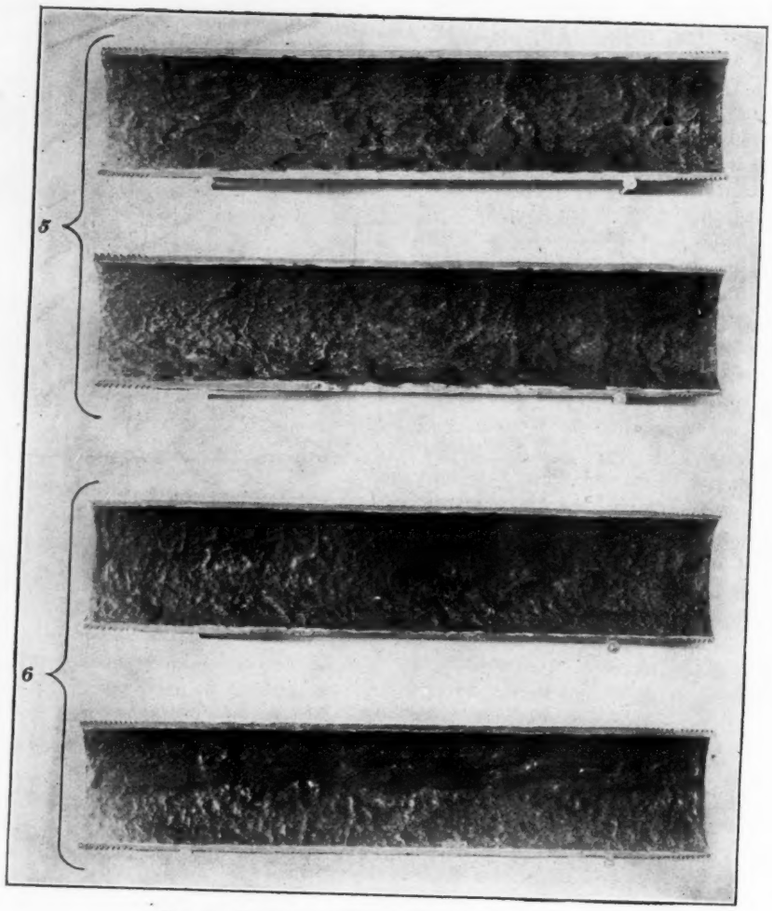


FIG. 5—PITTING IN PIPES NO. 5 AND NO. 6.

galvanized samples are not included here because the zinc coating affects their durability.)

This is where we are tempted to stop short and conclude that as the steel pipe in this test has lost more metal than the wrought-iron pipe it follows that the wrought-iron pipe is the more durable. But such a conclusion would be misleading and absurd in the extreme, because the life of a pipe depends not upon the amount of the corrosion but upon the deepest pitting. A certain pipe may lose only 1 per cent of its weight by corrosion when it begins to leak from some pittings, while another pipe may have lost 50 per cent of its weight by corrosion and still be perfectly tight and serviceable. Therefore, it appears evident that in order to determine the relative life of the samples it is necessary to measure the depth of the pittings and base conclusions on these measurements.

With this end in view, we sawed open each sample lengthwise; then an expert in micrometer measurements, a toolmaker accustomed to very fine work, was detailed to measure the depth of the five deepest pittings in each half, making 100 micrometer measurements. It really was only necessary to measure the deepest pitting in each piece, but to locate it by the eye was impossible. By selecting the five which appeared to be the deepest, however, we felt sure that we measured the deepest pitting in each piece.

The accompanying Table II is a record of the results of this test.

The thickness of the metal under each pitting was first measured by "Starrett" transfer calipers having sharp points; then a very delicate small inside caliper was used to just touch the points of the transfer caliper, and the distance between the points of the inside caliper was measured with a 1-inch micrometer. Each pitting was measured in the same way and by the same person. The measurements recorded here are believed to be correct to within 1/1,000 of an inch.

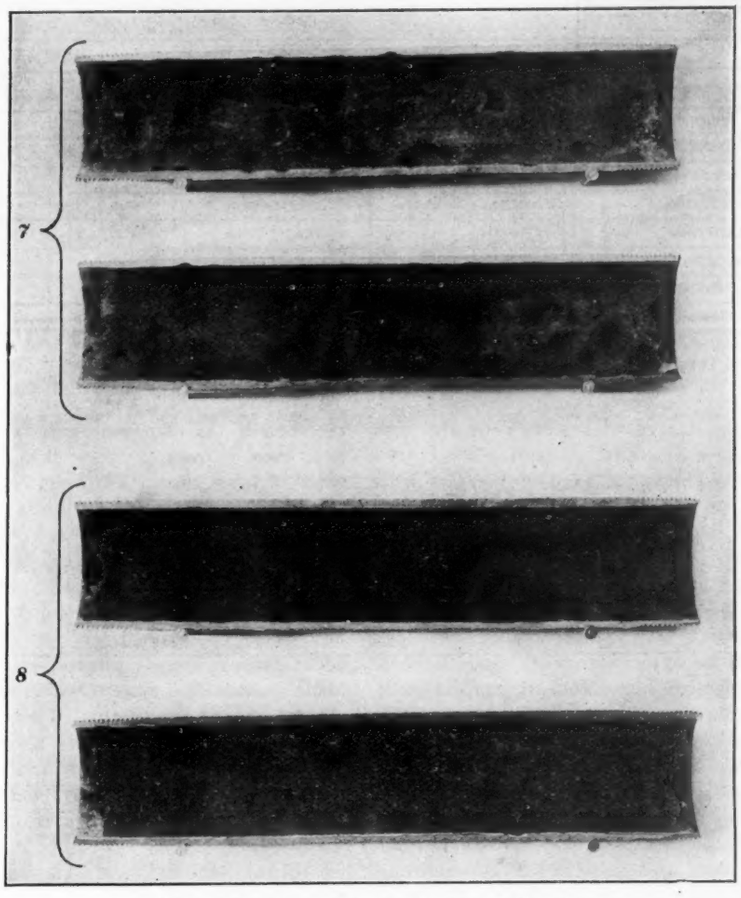


FIG. 6—PITTING IN PIPES NO. 7 AND NO. 8.

Figs. 3, 4, 5, 6 and 7 are from photos of the samples after they were cut in halves. A close examination will show quite a difference between the corrosion of the steel and the iron.

Summary.

Assuming that corrosion had been continued at the rate which existed during the period of the test, then the different samples would have become corroded through at the end of the number of days given in the accompanying Table III:

Table III—Durability of the Samples.

PLAIN PIPE.

No. 10.	Steel pipe	850.4 days
No. 5.	Wrought-iron pipe	780.5 days
No. 6.	Steel pipe	780.5 days
No. 2.	Steel pipe	759.7 days
No. 9.	Wrought-iron pipe	759.7 days
No. 1.	Wrought-iron pipe	686.5 days

GALVANIZED PIPE.

No. 8.	Steel pipe	1,162.9 days
No. 3.	Wrought-iron pipe	1,162.9 days
No. 7.	Wrought-iron pipe	770.0 days
No. 4.	Steel pipe	619.3 days

The average life of the plain steel pipe samples is 769.9 days, while the average life of the wrought-iron samples is 742.2 days, making a difference of 54.7 days in favor of steel.

FLUXES FOR SOFT METALS.

The three principal soft metals are lead, tin, and zinc. Mixtures in which there is considerable zinc must be fluxed with sal-ammoniac in the same manner as pure zinc.

The subject of fluxes may be summed up in the following table:

Metal.	Best flux.
Tin	Tallow.
Lead	Rosin.
Solders	Rosin.
Lead Alloys	Rosin.
Tin Alloys	Rosin.
Zinc	Sal-ammoniac.
Zinc alloys	Sal-ammoniac.

In the case of tin or tin alloys, rosin will be found better than tallow for making solder or babbitt metal, but if tinning is to be done, tallow should be employed.

The method of using fluxes on soft metal is as simple as it possibly could be. The rosin, sal-ammoniac, or other flux is sprinkled upon the surface while the metal is melted. No more than is necessary to clean the metal is used. The liquid scum is then skimmed off.—*The Brass World.*

A NEW BEARING METAL.

M. C. J. Reed, of Philadelphia, has obtained a patent on an alloy of 85 per cent lead, 10 per cent arsenic and 1 to 5 per cent copper, which is reported to give good results as an anti-friction bearing metal. For bearings for certain uses the proportion of arsenic may be very much greater and may in some cases advantageously be increased to 50 or even 70 per cent. In preparing the alloy, particularly where the proportion of arsenic is relatively high, it is advantageous to melt the elements together in a receptacle while under greater than atmospheric pressure so as to prevent volatilization. For anti-friction bearings the copper may in some cases be dispensed with and the arsenic and lead be combined by melting.

TRACING THE WORK THROUGH THE SHOP[1]

By Oscar E. Perrigo.

In the successful management of a manufacturing establishment, whether engaged in the production of a multitude of small interchangeable parts in a manner that might be called factory work, or the handling of machine work of any kind even up to the building of the largest and most powerful machines, it will be a matter of vital importance to be able to locate quickly and accurately every order going through the shops, and also the component parts that go to make up that order when completed.

It has often been contended that all our care, study and planning of buildings, of dividing them into appropriate departments; of arranging the necessary machines in them; of installing a proper power plant and a suitable distribution of power, had as its final objective result, the highest efficiency of machines and men. The argument is sound, and if we attain these valuable results we have gone a long way on the road to success. But we shall never reach the goal of success or good management unless we can locate orders and the work they represent with certainty and promptness.

There is another phase of this matter. The fact that we can do this, and the knowledge of that fact among foremen and workmen, will usually operate to increase the general efficiency of both the machines and the men. There is a well marked moral effect upon the force in the fact that the management is "keeping tabs" on the work, and knows exactly what is going on, and how fast it is going on. In the fact that if a machine is stopped for any considerable length of time; if an order is "side-tracked" or held up because a machine is out of order, or from carelessness or lack of attention, there is going to be some sharp questioning, and somebody will have to answer for it, and it will with a great degree of certainty be the man who was really at fault.

On the other hand, if there is little or no system for tracing orders and the work which they represent, this fact is quite well known to the workmen, and it matters not how good and well disposed the force may be in a general way, many careless habits will be the consequence, and the conditions of inattention, delay and indifference to the real progress of the work will surely result. Similar conditions are well known and more or less appreciated by every practical shop man who has been charged with the responsibility of getting out the product and keeping the different departments up to the work.

The writer once took charge of a shop in which the usual "orders in the works" at any one time should number about 100. A week or so later the general office sent in a list of 825 orders of whose progress they desired information. The fact that the officials of the general office were hardly better informed as to the correct conditions than the shop authorities, was proven a few days later when it was shown that nearly one-third of the number of orders in question had been completed and turned in to the general office. The general spirit of laxity and inefficiency in the progress of orders in the shop, which had been complained of was easily accounted for and efforts at once made to install a system which would change these conditions. This also proved that when reform is necessary, it should being at the top and work downward rather than the reverse.

With such conditions existing in many shops there have been many efforts in various directions and on different plans to bring about a betterment, not only of special and local conditions, but in a broad and comprehensive spirit, so as to have a beneficial effect upon the general efficiency of the plant.

The following plan was formulated by the writer for a shop making a variety of gears and doing a good business in cutting gears from finished blanks sent in by customers. As a considerable portion of the business consisted of short jobs and many of them, the effort was made to have the plan as simple as possible and yet fulfill its purposes. The requirements were: A plan that would give all the necessary facts relating to the order when received in the shop, and

ORDER NO				CUSTOMER'S DATE ORDER RECEIVED				ORDER WRITTEN RECEIVED IN SHOP			DATE PROMISED DATE COMPLETED		
NUMBER AND KIND				A				B			C		
DIMENSIONS					DIMENSIONS						TIME		
PARTS	A	B	C		PARTS	A	B	C			DEP'T.	MACH.	MAN
O. DIAM.					P. DIAM.						TOOLS		
FACE					HUB. DIAM.						TURRET		
HOLE					HUB. PROJ.						TURNING		
PITCH					GEN. ANG.						H. CUTTING		
TEETH					FACE ANG.						L. CUTTING		
KEYWAY					CUT. ANG.						BEV. PL.		
SET SCREW					CEN. TO CEN.						BRASS		
STYLE											MISC.		

Fig. 1—The Order Card, 3 x 5 Inches.

ORDER NO.				CUSTOMER'S DATE ORDER RECEIVED			ORDER WRITTEN RECEIVED IN SHOP			DATE PROMISED DATE COMPLETED			
NUMBER AND KIND				A			B		C			INSPECTION	
DIMENSIONS					TRANSFERS						QUAL.	TIME	
PARTS	A	B	C		DEP'T.	DATE						MACH.	MAN
O. DIAM.					STOCK								
FACE					TOOLS								
HOLE					TURRET								
PITCH					TURNING								
TEETH					H. CUTTING								
KEY WAY					L. CUTTING								
SET SCREW					BEV. PLANE								
					BRASS								

Fig. 2—The Tracing Card, 3 x 5 Inches.

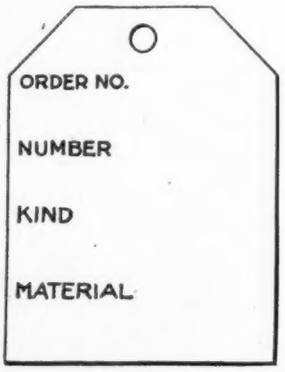


Fig. 3—The Progress Tag, 1½ x 2.

[1]Sixth of a series of articles on "Shop Management and Cost Keeping."

the entire history of the work during its progress through the different departments. And in connection with these facts to keep an accurate record of each machine, whether working or idle, the particular work it is engaged upon if running, and if not, the reason for its being idle.

Fig. 1 shows the order card for all ordinary work, giving the necessary information in a condensed form. For the making of spiral gears and others necessitating a large number of dimensions not provided for on the face of this card, the additional figures and information were provided for on the back of the card. This order provided for three different lots of work, indicated by A, B, C, which were usually gears and pinions running together. If the order comprised more than these, as many cards were used as might be needed having the same order number and marked No. 1, No. 2, and so on. For work that was to take its usual course through the shop a white card was used. If the work was to be pushed ahead of that ordered on white cards, a blue card was used. Rush orders were made on a red card and the work they represented took precedence over both the white and blue cards. An order already in force could be hastened by attaching to it a small blue or red tag.

For the purpose of tracing the progress of the work at tracing card, Fig. 2, was used. It was of the same color as the order card it represented. In this card the date form was the same as the order card. These several dates were given so that the progress of the order might be traced from the receipt of the customer's order in the office until it was received in the shop, so that office delays might not be charged to the shop. The date promised and the date completed formed a convenient and quick reference to the time the order had been in the shop. The first columns of the body of the card gave space for sufficient dimensions with which to identify the work. The center columns were devoted to the transfers of the work from department to department in its progress through the works. The right columns furnished space for noting the results of the inspection made as each department had completed its share of the work.

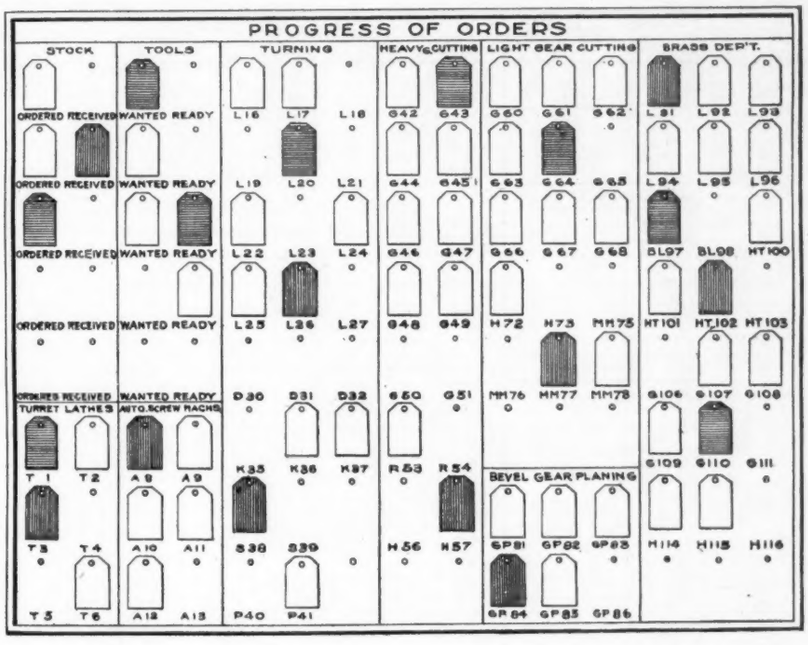


FIG. 4—PROGRESS OF ORDERS BOARD, SHOWING THE WORK ON DIFFERENT MACHINES.

The operation of the plan was as follows: The order having been received from the general office, the superintendent's clerk stamped on it the date and filled out the tracing card, which he stamped with a rubber dating stamp in the space opposite the first department to which it was to be sent under the head of transfers. This card he filed in a drawer fitted with guide cards for the different departments, and in each of these divisions according to the serial numbers. If the stock was ready he would send it, with the office order to the proper department. If tools were needed before the work could proceed, he would send the order to the tool room that they might be made ready. In any case, as soon as a department had completed its share of the work, the order and the work was delivered to the inspector (in or near the superintendent's office), who inspected the work and noted the result on the tracing card. The work and order was then sent to the next department, the tracing card stamped in the proper space with the date, and filed in the proper division indicating the department to which the work had been sent. If work was proceeding simultaneously in two or more departments, it was duly authorized by duplicate orders, marked "Duplicate, No. 1," "Duplicate, No. 2," and so on; and the facts noted on the back of the tracing card. When the work was finally completed the original order was stamped with the date and returned to the office. The tracing card was stamped "Completed," dated, and filed by its serial number, in a drawer labeled "Orders Completed."

By this means any order could be located in the department where work was being done upon it. In addition to this portion of the system the same idea was carried still further, whereby the individual machine upon which work was being done on an order could be known, and at the same time other valuable information was obtained.

The machines were all numbered serially, classified and a class symbol assigned to them, as follows:

L, Engine lathes, speed lathes.	S, Shapers.
BL, Bench lathes.	G, Gear cutters.
T, Turret lathes.	GP, Gear planers.
HT, Hand turret lathes.	R, Rack cutters.
A, Automatic screw machines.	H, Hobbing machines.
D, Drills.	MM, Milling machines.
P, Planers.	K, Keyseaters.

When a tracing card was filled out a progress tag, as shown in Fig. 3, and of the same color as the tracing card, was also filled out, giving brief information by which the work might be identified. A progress of orders board, as shown in Fig. 4, was divided into sections representing the departments of the shop. Within these sections was a space representing each machine and bearing its symbol and serial number. Also, a pin upon which the progress tag might be placed. If stock was wanted the tag was hung on the proper pin under "Stock." If tools were also needed a duplicate tag (so marked), was hung on the proper pin in that direction. These were changed to the space marked "Received," or "Ready," at the proper time. When the work was

sent to the first department and put on a machine the progres tag was hung on the pin representing that machine. Any change in the location of the work was indicated by a corresponding change in the location of the tag. Thus the exact machine where the work was being done could be located, and a few minutes' study of the tags on the board would show what machines were at work, and upon what orders; what machines were idle, and consequently open for new jobs as they came along.

A further advantage of the use of this board was that when rush jobs came in, or jobs that must be done on certain machines, a glance at the board would show what machines were available, or if the work was already on them, whether there was more than one job ahead, since if there were several jobs that must be done on a certain machine the tags representing them would be placed on the board for that machine as soon as they were written, and with the exception of those represented by blue or red tags they would be put on the machines in the order of their dates.

For the purpose of keeping informed as to the working of the individual machines the daily report shown in Fig. 5, was devised. This was divided into spaces representing departments and in each of these was a space devoted to each machine, which was represented by its symbol and number. Following this there were four columns headed 8, 11, 2, and 5, which represented the hours of the day, upon which a clerk made regular rounds noting in the proper space the condition of the machine. For this purpose he used letters as follows: If idle and waiting for repairs, R. If waiting for stock, S. If being adjusted or "set up," A. If there was no work for it, W. If the machine was running he wrote in the order number it was engaged upon. Upon his return to the superintendent's office that official looked over the report, noted idle machines and saw that they were promptly looked after.

The moral effect of this method of keeping track of the work of the machines was important and was a source of increased efficiency of both men and machines, since it quickly showed up neglect or incompetence and the natural pride of the men impelled them to correct these difficulties and make a creditable showing.

Another plan of ascertaining and keeping in close touch with the progress of the work is by means of the board shown in Fig. 6. This is a case rather than simply a board, and is closed by a glass door D. This door is hinged to the framework C, and can be locked to prevent any unauthorized tampering with it, or any accidental changing of the recording devices.

The back board A is grooved for the reception of the several narrow shelves B, B, the ends of which are held in grooves in the frame C. The number of these shelves is sufficient to accommodate the number of orders received but not acted upon at any one time. The width of the board is sufficient to contain as many columns 1½ inches wide as may be necessary; first, to give a column to the orders received, and one each to indicating the receipt of drawings, patterns, castings and other stock, and second, one column to each department through which the work is to pass. In the present case the board provides 18 vertical spaces and 16 horizontal spaces. It is 30 inches wide by 22 inches deep outside. In the illustration the glazed door shown in the vertical section is removed in the front elevation. The vertical columns are formed by distinct lines on the face of the back board.

The necessary information taken from the order blank or card is written upon gummed paper one of the three colors, white, blue and red, according to the urgency of the order.

DAILY REPORT OF MACHINES FOR 190

TURRET LATHES					HEAVY GEAR CUTTING					BEVEL GEAR PLANING				
MACHINE	8	11	2	5	MACHINE	8	11	2	5	MACHINE	8	11	2	5
T 1					G 42					GP81				
T 2					G 43					GP82				
T 3					G 44					GP83				
T 4					G 45					GP84				
					G 46					GP85				
AUTO. SCREW MACH.					G 47					GP86				
A 8					G 48									
A 9					G 49									
A 10										BRASS DEP'T.				
A 11					R 53					L 91				
A 12					R 54					L 92				
										L 93				
TURNING					H 57									
L 16										BL 96				
L 17					LIGHT GEAR CUTTING					BL 97				
L 18					G 60									
L 19					G 61					HT 100				
L 20					G 62					HT 101				
L 21					G 63					HT 102				
L 22					G 64					HT 103				
L 23					G 65									
L 24					G 66					G 106				
					G 67					G 107				
D 30					G 68					G 108				
D 31										G 109				
D 32					H 72					G 110				
					H 73					G 111				
K 35														
K 36					MM 75					H 114				
S 38					MM 76					D 116				
P 40					MM 77					D 117				
P 41					MM 78									

FIG. 5—DAILY REPORT OF MACHINES SHOWING THEIR CONDITION.

These slips are attached to the faces of wooden blocks as shown in Fig. 7, 1 inch high, 1¼ inches long, and ¾ inches deep. In the regular use of this device, the block, thus prepared, is placed on a shelf in the first column, as at E. When the drawings are received it is moved along to the next column, headed "Drawings." It is similarly moved as patterns are ready, as iron castings are received, and so on. To properly represent the progress of the work it is frequently necessary to use more than one of these blocks for an order. For instance, the iron castings may have

been received and the block advanced to that column as at F. But although the planers are ready to work on the castings, this particular block cannot be advanced to that point as the other kinds of stock

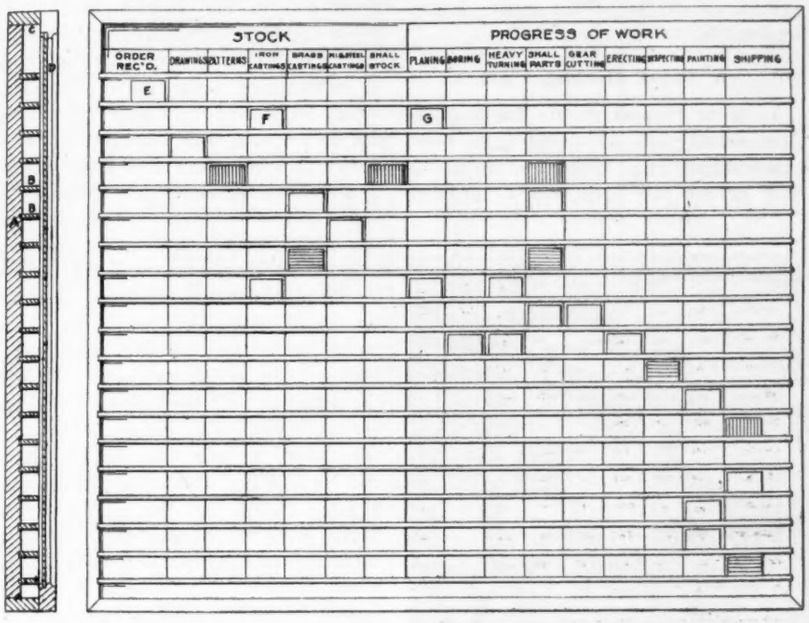


FIG. 6—PROGRESS OF ORDERS BOARD, WITH SLIDING BLOCKS.

are not yet on hand. Hence another block is prepared and marked "Duplicate, No. 1," and placed at G. There may be any number of these that the work may require, each being the same color as the original, marked as a duplicate and serially numbered.

A clerk will make the rounds of the departments soon after commencing work in the morning and again after the dinner hour, and make note

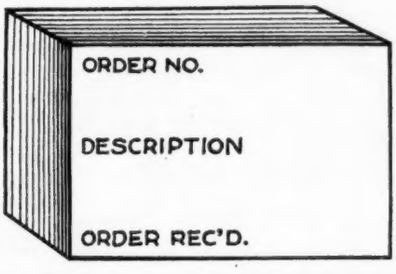


FIG. 7—THE SLIDING BLOCK USED ON THE PROGRESS BOARD IN FIG. 6.

of the condition of each order in the shop and upon his return he will make such changes on the progress board as may be necessary. If most of the jobs are large ones it may not be necessary to make more than one round each day.

Different kinds of work may require a different division of the surface of the board in order to bring out the information desired.

When work on an order is completed the blocks representing it are removed from the case, the record on them cancelled and they are ready for use in future orders.

The important advantage gained by the use of this method in a general machine shop is, not alone that each order may be readily followed through the various departments and its condition and progress be easily seen, but a very clear and accurate knowledge of the general condition of the work in the different departments may be easily grasped by the facts being graphically arrayed in this comprehensive manner.

The above arrangement gives only the fact of the transfer of the work from one department to another, but does not give the date of the transfer. This is usually an important fact to know. In the above case the dates must be kept in some other manner, as by the tracing card, Fig. 2, or some similar means, the progress board being used principally for the purpose of getting a general and comprehensive view of shop operations, and the card system for exact details.

These dates may be shown by the use of larger blocks, such as shown in Fig. 8, which give space for writing in or stamping the dates as the transfers are made. In this case the board must be much larger, say one-third wider and twice as high. However, a board constructed on this plan will give very complete and detailed information and by its use a card system will not be necessary.

In all manufacturing establishments where machine work is done and materials have to be obtained and accounted for some such device as has been described and illustrated will be found very useful, and when once

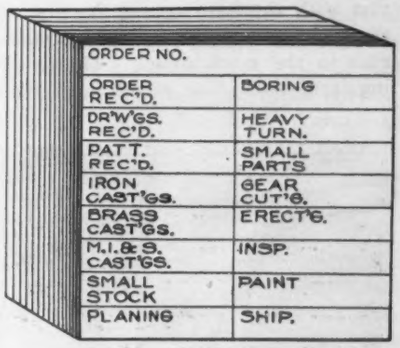


FIG. 8—SLIDING BLOCK GIVING COMPLETE DATE OF TRANSFERS.

used for any considerable length of time will become so popular that managing officials will not try to do without it.

For lack of space in this article several plans for tracing the progress of work remain to be treated in a future article.

DEVICE FOR SHAPING CRUCIBLE TONGS.

The February issue of *Graphite*, published by the Jos. Dixon Crucible Co., Jersey City, N. J., contains a description of an iron crucible intended for use as an anvil on which crucible tongs can be shaped. From the bilge, or its widest section downward, the iron crucible has the same shape as the graphite crucible, but from the bilge upward it is made a trifle larger than the crucible, so that when the tongs are perfectly fitted on the pot there will be sufficient space to prevent any possibility of squeezing when placed on a graphite crucible. These pots are made to match the various sizes of crucibles. The brass foundryman can thus be his own blacksmith and by heating the tongs in the furnace and clamping them on the iron pot as they would be clamped on a graphite crucible they can be forged into shape in a short time.

Inasmuch as there is considerable outlay involved in making patterns for iron crucibles and as the brass foundry requires only one of each, the Jos. Dixon Crucible Co. has arranged with E. R. Klemm, 103 West Monroe street, Chicago, to furnish these iron crucibles for all of the standard sizes of Dixon's crucibles.

FEATURES OF THE NEW MACHINE SHOP OF L. O. KOVEN & BRO., JERSEY CITY, N. J.

In a large machine shop which L. O. Koven & Bro. have just completed as an addition to their sheet metal works in Jersey City, N. J., a number of noteworthy features have been developed, particularly in connection with the lighting and heating of the building and the storage of materials in the stock rooms. The building is of brick, four stories and basement, and measures about 90 feet in length by 40 feet in width at one end and 50 at the other. The basement is given over to storage purposes and to the heating plant; the ground floor is planned for the heavier machine tools, the second story will accommodate a lighter class of equipment, the third, now used for the storage of finished work, will also eventually be devoted to machine tools, and the fourth accommodates the drafting rooms, with private offices for the chief draftsman and others, and affords ample room for pattern storage as well. The floors throughout the building are of maple. The elevator shaft is enclosed by fire walls with fire-proof doors opening out on the various floors, and a fire escape, built at the works in strict conformity with legal requirements, is attached to the front of the building. One end of the second floor is fitted up as a tool room, with suitable racks and boxes for smaller tools, all of which are issued to workmen by a system of checks which makes losses impossible.

FIG. 1—BANQUET TO WORKMEN AT OPENING OF NEW SHOP OF KOVEN & BRO.

A Novel Heating Plan.

It is in respect to its heating arrangements that this building is most remarkable. In planning and installing this system the idea was to provide a steady, uniform heat throughout the building and by maintaining this constantly to avoid the inconvenience and retarded, awkward work which results from the handling of cold materials and the operating of chilled machines. The Koven company figured that the increased cost of installing and maintaining this system would be more than counterbalanced by the increased capacity of their workmen and the absence of the clumsy, slipshod product which is inevitable with benumbed fingers. As much of the output of these works is such as to require extremely careful machine shop work, these expectations will doubtless be realized to their fullest extent.

The building is heated by hot water, from an ordinary heater located in the basement. This is distributed to the various floors by a double set of main pipes, one for the up-going current and one for the return being located on either side wall. This arrangement insures a continuance of heat during a breakdown in one set of pipes and has other apparent advantages. On each floor connection is made with a series of eight pipes, each one and one-half inches in diameter, which run along the entire side wall beneath the windows. No radiators are used, except in the drafting room and offices.

The basement, given over entirely to storage purposes, is low, having perhaps but 8 feet of heat room. Just above the storage racks and the space reserved for those materials which are not placed in racks, are the main pipes leading from and to the heater. These are attached to the girders of the ground floor. The result of this arrangement is that the angles, bars, etc., in storage are never allowed to become chilled and the machinist can begin work on a new piece of steel without suffering the discomfort usual when materials are stored in an unheated room. Sufficient heat will be carried through the pipes on the upper floors to prevent the chilling of equipment over night and Sunday.

Lighting Facilities.

The building is clear on all sides and has been liberally provided with large windows, the lower half of which are of clouded ribbed glass, furnishing a steady radiation which is much more satisfactory than the plain glass. In addition, the walls, girders, and other exposed surfaces have all been painted white, with surprisingly good effect. The tungsten lamp is employed for artificial light, having been found far superior to the ordinary carbon filament incandescent. These are located at regular intervals, no clusters being employed, and a light that is uniform over the entire floor is secured. In the drawing room large skylights are also provided.

Some Storage Features.

As the output of the Koven works is largely in sheet metal lines, the annual consumption of rivets is heavy and arrangements for their storage have been made by building a series of bins across one end of the basement, thus obviating the necessity of having a large number of kegs to overhaul when a fresh supply of a certain size rivet is wanted. The method of heating materials in storage has already been referred to. Plates, sheets, etc., are stored in regular piles about

the concrete floor, leaving a wide passageway down one side of the building.

Particular attention has been devoted to storage facilities for bars, light angles and other long pieces. A rack embodying a number of commendable features has been designed by the chief draftsman, Mr. Furman. This consists of an upright of 3-inch pipe, to which is clamped at any desired height a cast iron cross section about 3 feet in length. This section is turned upward at right angles at either end. On its face it is 2 inches in width and this width prevails to a depth of 1 inch, below which it is narrowed to a 1-inch web increasing in depth toward the center. At the center of this section is cast the half of a 3-inch ring; the other half is cast slightly smaller, so that a perfect grip on the vertical standard is secured by bolts on either side. These cross sections can be arranged in any desired position on the uprights, or, if necessary, removed entirely, when very little space is taken up. The uprights are bolted, by means of proper receptacles, to the floor and to a wood strip fastened to the girders.

Both electric and pneumatic drive will be employed, though most of the machines will be belt-driven from shafting connecting with motors conveniently placed. Wrought iron pneumatic tubes are also in place. Every convenience for the comfort of the workmen has been provided, toilet room fittings and wash basins having been largely constructed at the old works. Hot and cold water are provided in the basins and individual soap boxes are included. These basins are set on concrete floors. A complete dark room and blue print department have also been arranged. The building has a floor area of about 21,000 square feet and, in addition to providing for the machine shop requirements of the class of work done at present, will admit of a general machine shop business.

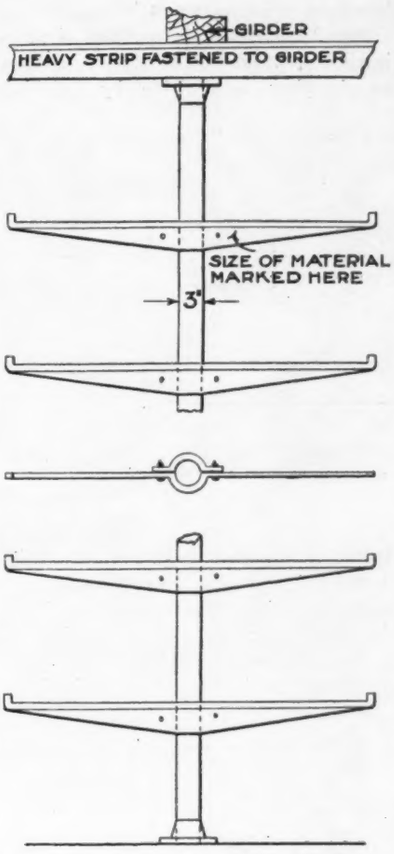


FIG. 2—RACK FOR MATERIAL STORAGE AT PLANT OF KOVEN & BRO.

The completion of this building was recently made the occasion for a dinner and reception tendered the workmen and a number of invited guests by the members of the firm. After the banquet a vaudeville program was presented and a number of the workmen added stunts of their own. Brief speeches were made by the owners of the works and several guests.

A contract for 526,000 pounds of copper cable has been closed with the Pittsburg Underground Co., by the Winona Interurban Co., which is building an electric line from Warsaw to Peru. It is understood that the contract price was $76,270.

DATA ON PRACTICE IN AMERICAN RAIL MILLS.

The accompanying table, published in the *Railway Age*, exhibits data as to the practice of 12 American mills in rolling steel rails, with regard to the size of ingot, number of passes, shrinkage allowance and discard. The figures given are based upon the average of 50 consecutive ingots rolled in each mill, and should be fairly representative of the practice obtaining on the date given, Dec. 1, 1907.

The most striking feature of the table is the wide variation in the number of passes in reducing the ingot to rails at the different mills, which is indicative of corresponding differences in the initial temperatures of ingots and blooms on entering the rolls.

The data relative to the percentages of the bloom and rail that are discarded at different mills are also especially interesting in view of the recent discussions on this point.

Data on Practice in American Rail Mills—Dec. 1, 1907.

Mill.	Section of ingot, inches.	Estimated average weight of ingots, pounds.	Number of passes. Blooming	Roughing.	Finishing.	Total.	Saw run, seconds.*	Shrinkage allowed by mills on 33-foot rails, inches. 70-pound.	80-pound.	85-pound.	100-pound.	Discard from bloom. Average crop, inches.	Estimated weight, pound.	Per cent of weight of ingot.	Discard from rail. Rail section, pounds.	Average crop, inches.	Estimated weight, pounds.	Per cent of weight of ingot.	Total discard. Per cent of weight of ingot.
A	18½x19½	5,400	19	8	3	30	35	...	6¼	...	6¼	23.5	474	8.77	80	21.1	46.9	0.87	9.64
B	19 x23	6,000	15	10	2	27	17/19	5 15/16	6	6	6 3/16	27.7	628	10.46	80	30.1	67.0	1.12	11.58
C	17½x19½	4,800	7	10	1	18	12/14	...	...	6¼	...	15.8	437	9.10	85	26.3	62.1	1.29	10.39
D	17½x19½	4,800	7	..	..	..	.....	7½	...	...	...	15.8	437	9.10	65	24.2	43.7	0.91	10.01
E	18 x22	.....	11	10	1	22	12/17	5⅞	6⅛	6 3/16	...	....	...	.....	..	....	....	....	.....
F	18 x20	4,720	17	7	5	29	32	6 11/16	6⅞	7	...	25.5	446	9.45	85	25.4	60.0	1.27	10.72
G	18 x19	4,360	9	8	1	18	12	6 13/16	7	7⅛	7¼	12.0	245	5.63	85	17.0	40.1	0.92	6.55
H	19 x19	4,200	6	4	5	15	40/45	6⅛	6⅜	6½	6⅝	10.8	195	4.65	80	32.2	71.5	1.70	6.35
I	20 x22	5,750	13	6	5	24	28/30	6¼	6¼	6¼	6¼	34.2	475	8.26	90	20.7	51.8	0.90	9.16
J	19 x23	6,800	15	10	1	26	.....	...	...	...	...	39.0	707	10.40	75	24.0	50.0	0.74	11.14
K	17 x17	.....	9	6	5	20	5	6⅝	6⅝	6⅝	6⅝	....	...	.....	..	....	....	....	.....
L	.....	.....	..	..	..	..	16/19	...	...	5 15/16	...	....	...	.....	..	....	....	....	.....
M	19 x23	6,690	15	7	2	24	27	6⅛	6¼	6 5/16	6½	25.6	465	6.94	85	27.0	64.0	0.96	7.90
N	18 x21	6,127	11	10	1	22	.....	...	6⅛	...	6¼	24.1	359	5.87	60	17.0	28.3	0.46	6.33

*Time in seconds from time rail leaves finishing rolls till saw drops.

Notes: A—Blooms reheated. Rails held between passes 35 seconds till both ends of first rail are cut. B—Blooms reheated. C, D—Blooms reheated; rails not held between passes. E, F, G. M—Rails not held between passes. H—Rails held 40 to 45 seconds till both ends of first rail are cut. I—Rails held between passes.

FINISHING GAS ENGINE PISTONS AND PISTON RINGS IN A TURRET LATHE

The accompanying illustrations show a method of using a turret lathe to finish gas engine pistons and piston rings. We are indebted to The Gisholt Machine Co., Madison, Wis., for the information given herewith and the drawings. Referring to Fig. 1, which shows the method of finishing pistons, the piston A is held with special hard chuck jaws B in the three-jaw scroll chuck. The piston has a ring for chucking purposes cast on the closed end. The ring is about 1¼ inches long and of a diameter but slightly less than that of the piston itself. The first operation is rough boring the piston, which is done through the open end by the cutter N carried in the boring bar M, which in turn is inserted in a drill holder on the main turret. The bar is supported by means of a hinged drill support fastened to the lathe carriage close to the work. After rough boring the work is finished bored by the cutter N_1 carried in the boring bar M_1 fastened to the piston face of the turret and similarly supported. After finished boring the drill support is turned back on its hinge so as to be out of the way, and the piston is rough turned by the tool K in the turret tool post. The tool is not shown in the proper position for work. After rough turning it is finished turned by tool J, also carried in the turret post, which at the finish of this operation is turned 90 degrees, bringing the gang tool L into position to cut the piston ring grooves. This completes the first operation and the piece is then reversed and held in soft jaws, which have been substituted for the hard jaws B, and which are bored to the finished outside diameter of the piston. The chucking ring is then cut off and the end of the piston faced. In case the crank pin hole is to be finished a third operation is necessary, using a self-centered chuck-plate and the necessary boring tools, which, however, are not shown here.

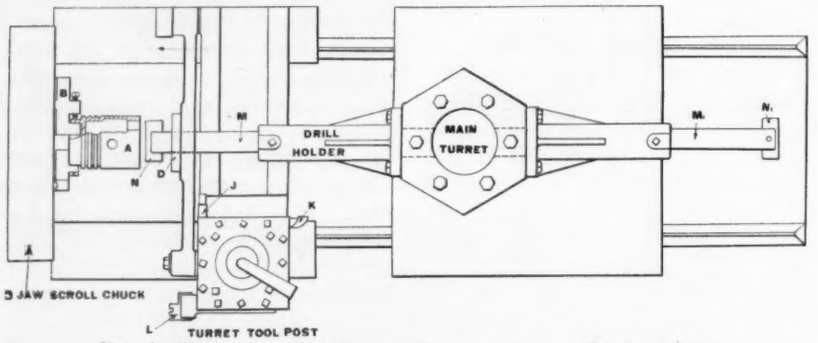


FIG. 1—FINISHING GAS ENGINE PISTONS IN THE TURRET LATHE.

Fig. 2 illustrates the method of turning piston rings which gives a greater output than is possible by finishing them in the usual way on the engine lathe. A cast iron cylindrical piece with three lugs, shown at B in the illustration, cast on one end, is held in a three-jaw scroll chuck. The piece A is about 10 inches long, and if the rings are to be concentric inside and out, the standard chuck jaws may be used. The piece is rough and finished bored by the cutters N and N_1, respectively, held in boring bars M and M_1 on the main turret. While taking the cut the bars are supported by the bushing R in the chuck. The periphery of the piece A is rough turned by the tool K in the turret tool post, which operation is performed while rough boring is being done. After the piece has been rough turned and the hole finished the turret tool post is rotated to bring into action the finishing cutter J. After finishing the tool post is again revolved bringing into position the cutters L, which cut off almost simultaneously four piston rings. It will be noted that the first cutter is set a little in advance of the second, the second in advance of the third, and the third in advance of the fourth. If the bore of the ring is not to be concentric with the periphery, the cylindrical piece A is first bolted to the sliding chuck plate C and the periphery rough turned with the tool K in the tool post and finished to size with tool J. The sliding chuck plate carrying the piece A is next moved over a distance equal to the eccentricity desired and is then rough and finished bored, the same as for concentric rings. The tool post is then revolved and the rings cut off by the tool L as before. The faces of the rings may be finished in another operation if desired, or they may be ground. Practice differs in regard to this point.

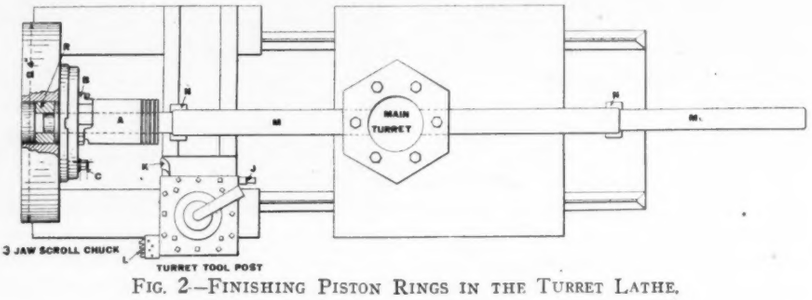


FIG. 2—FINISHING PISTON RINGS IN THE TURRET LATHE.

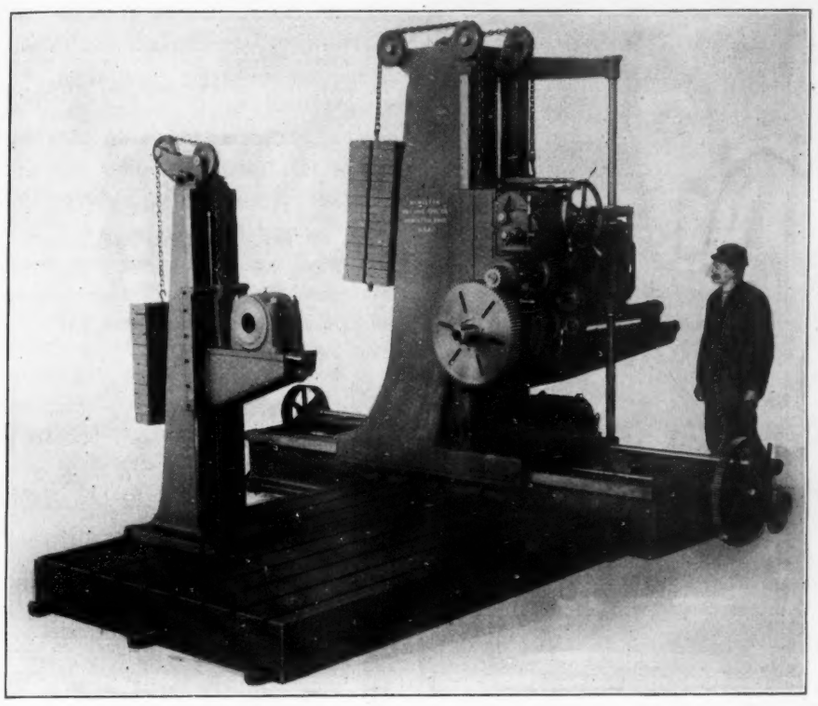
A NEW HORIZONTAL DRILLING, BORING AND MILLING MACHINE.

The accompanying illustration shows a new horizontal drilling, boring and milling machine placed on the market by the Hamilton Machine Tool Co., Hamilton, O. The tool combines great power and rigidity with facility of adjustment and operation. It is available for drilling, boring and tapping and for milling spots, bearing surfaces, T-slots, etc., at one setting of the work, and is especially available for machining large, unwieldy pieces which are difficult or inconvenient to move. After these are once placed on the floor of the machine the spindle can readily be adjusted to perform the different operations within its range.

In general design the machine consists of a floor plate, on which the work is placed, a main column carrying the horizontal spindle, and an outer support adjustable on the floor plate to suit the location of the boring bar and spindle.

The head, carried on the main column, which is adjustable on the bed, is counterbalanced and vertically adjustable on the column. The boring bar support on the outer column is

also adjustable and counterbalanced. Graduated scales provided on the main and outer support afford a ready means of obtaining correct alignment. Hand and power feeds are provided on the column and head in addition to the horizontal spindle. Eight automatic feeds are provided to both the column and head ranging from 0.0196 to 0.66 inch per revolution of spindle, affording ample range for milling and similar operations. The horizontal spindle also has eight automatic feeds ranging from 0.001 inch to 0.033 inch per revolution. The feeds are all gear driven, providing positive motion in either direction, and permitting changes to be quickly and easily made. Speeds and feeds may be changed while the machine is running and handles for operating are located within convenient reach of the operator.



THE HAMILTON HORIZONTAL MILLING, DRILLING AND BORING MACHINE.

The machine is driven by a single pulley running at constant speed. Speed changes are obtained by a combination of gearing enclosed in a gear box, making a compact and symmetrical arrangement. Sixteen speeds are available at the spindle ranging in geometrical progression from 2 to 180 revolutions per minute.

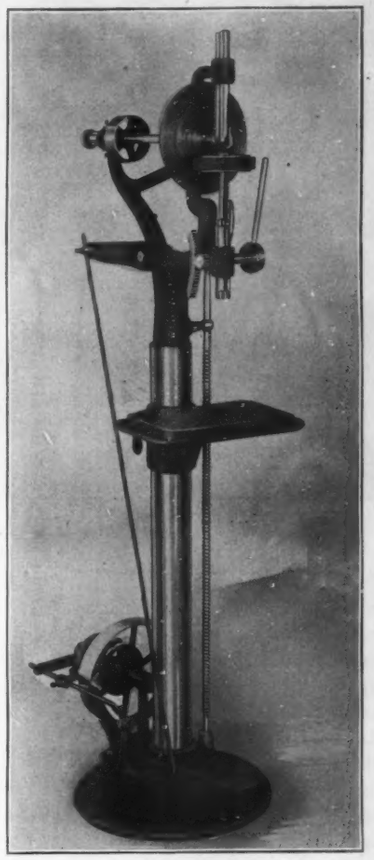
The floor plate, although usually made of the dimensions listed in the table below, can be built in any size that the work may require. Motor drive may be used if desired, the motor being direct-connected to the driving shaft in place of the usual tool. When this is done a 10-horsepower constant speed motor should be used, running at approximately 1,200 revolutions per minute. The following table gives the principal dimensions of the machine:

Size of floor plate—8 feet long, 6 feet wide, 10 inches thick.
Size of bed supporting main column—11 feet long, 32 inches wide, 16 inches high.
Size of main column—8 feet 8 inches high, 24 inches wide, 60 inches bearing on bed.
Traverse of column on bed—72 inches.
Head has bearing on column—24 inches wide, 48 inches long.
Vertical traverse of head on column—40 inches.
Size of spindle—4½ inches diameter, No. 6 Morse taper hole.
Traverse of spindle—36 inches.
Minimum distance from center of spindle to top of floor plate—24 inches.
Maximum distance from center of spindle to top of floor plate—64 inches.
Size of driving pulley—24 inches diameter, 4½ inches face.
Revolutions per minute of pulley—300.
Net weight—About 30,500 pounds.

During a recent meeting at Indianapolis, James W. Van Cleave, president of the National Association of Manufacturers, and D. M. Parry, former president of the association, agreed to support the Aldrich financial bill. Mr. Parry is quoted as saying: "There is no question but that it would relieve such conditions as existed in November last if it were a law, and I am heartily in favor of it." He said that he believed the association will endorse the measure at the May meeting.

THE BARNES FRICTION DISC DRILL.

The accompanying illustration displays the swinging friction disc drill built by the W. F. & John Barnes Co., Rockford, Ill. This tool is built for a swing of 10 inches and by means of the hand screw shown the platen can be raised and lowered rapidly through practically the full length of the column. The drill has the usual range and gradations of speed of a friction drive but special sensitiveness is claimed for the feed control of the speed and power of the drive. Speed changes or a reversal of the motion can be made without stopping the machine or shifting the belts so that the operator has instant control over the operations of the tool. This tool will drill holes up to 5/16-inch in diameter.



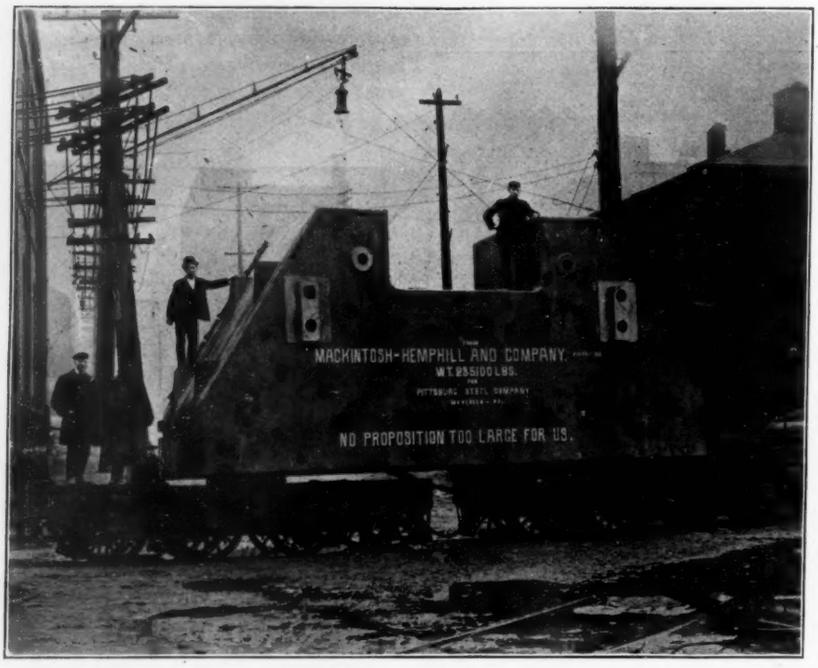
BARNES FRICTION DRILL WITH FOOT FEED.

The general dimensions of the drill are as follows:

Height of drill	56 inches
Greatest height from base of drill to spindle	48 inches
Greatest height from platen to spindle	36 inches
Distance from column to spindle	5 inches
Diameter of column	3½ inches
Diameter of spindle	¾ inch
Size of table	10 x 14 inches
Vertical travel of spindle	4 inches
Speed	up to 1,600 revs. per min.
Required floor space	22 x 18 inches
Weight	170 pounds

LARGE MILL CASTING BY MACKINTOSH, HEMPHILL & CO.

That more firmness and solidity of base parts is one of the aims toward which modern mill construction is directed, finds illustration in an iron casting just completed and delivered by Mackintosh, Hemphill & Co., Pittsburg, to the Pittsburg Steel Co., for the extension of the latter's plant at Monessen, Pa. The casting, which is the largest of mill design ever turned out by the company, and probably one of the largest of its kind ever made, forms a half base plate for the pinion housings of the 46-inch three-high blooming mill of the steel company. Its dimensions are 26 feet 6 inches long, 8 feet wide and 12 feet 1 inch high. Its weight is 235,100 pounds. A similar casting is now undergoing completion in the Mackintosh, Hemphill plant, and when this is completed and the halves fastened together, the two pieces will form the base plate for the pinion end of the mill.



LARGE MILL CASTING LOADED FOR SHIPMENT.

On account of the weight and size of the casting, the shipment could not be made on ordinary flat cars, and the plan pursued by Mackintosh, Hemphill & Co. and the Pennsylvania railroad to overcome this difficulty is interesting. A special top bolster plate measuring 6 feet 9½ inches in length, 2 feet in width, and ¾ inches in thickness was made. A center plate was riveted to the bolster plate, and the bolster plate in turn riveted to the casting, the latter thus forming the body of the car itself which rested upon four 8-wheel gun trucks. Gondolas were placed before and after the gun trucks to distribute the burden in the train. In this manner the casting was successfully delivered at its destination.

The machining of the casting was done on the company's immense planer, the largest tool of its kind in the world, which was described in THE IRON TRADE REVIEW on Jan. 2, 1908.

THE ROCKFORD STRAIGHTENING MACHINE.

The Rockford Drilling Machine Co., Rockford, Ill., is building a tool shown in the accompanying illustration, for straightening bends in shafts and spindles. The machine was built for use in this company's shop and has been so successful as to warrant its more extended manufacture. The tool has the general outline of a small lathe with a screw press and carriage substituted for the tool post and carriage of a lathe.

This tool will handle shafting up to 8 feet in length. The piece to be straightened is laid on supporting blocks placed between the head and tail stock and spanning the ways. These blocks are simply laid on the ways and can be located at will. They are bored true for each size of shafting or spindle, a complete set of blocks, covering the line of shafting sizes used, being a part of the equipment of the machine. In addition the support blocks are bored from 1-16 inch to 3-32 inches below the center of the spindle so that when the work is released it drops off the centers onto the blocks.

This permits of running the head stock spindle continuously. The head center is inserted in the spindle

THE ROCKFORD STRAIGHTENING MACHINE.

with a taper in the usual way but fitted on the center is a collar consisting of two faces separated by four spiral springs. One face of the collar shoulders against the center and the other has a friction leather surface which acts as a driver for the work, the tension of the springs between the faces being ample to hold the friction surface up against the piece when it is centered. The piece when lying on the support blocks is so little off the center that shoving up the tail stock centers it at once. The tail stock is clamped in the usual way and the operator chalks the piece as it revolves, marking the high places.

The work is then released by shoving back the tail stock and the screw press carriage running on rollers is adjusted very quickly on the bed to bring it wherever the bend shows up on the work. On the straightening screw is a revolving index plate for the guidance of the operator so that he can tell accurately the effect of each movement of the handwheel eliminating very largely the "cut and try" process. The screw has a fine thread and the large handwheel is usually all that is necessary to bring the required pressure for straightening but for heavier work a ratchet lever is provided and may be swung down into place supplementing the screw action.

The bed of the straightener is made very rigid and will carry reasonably heavy work. It offers numerous advantages over the common method of setting a shaft between the centers of a lathe and springing it with a piece of timber. Skill in judging the pressure required comes to the operator very quickly with handling the machine and the straightening soon becomes a comparatively rapid operation.

MONEL METAL.

Isaac G. Johnson & Co., Spuyten Duyvil, New York, is now producing small and complicated castings from an alloy known as Monel metal. It is said to be non-corrosive, and contains from 70 to 80 per cent of nickel. This metal is made in different grades. What is known as grade B has a tensile strength of 85,000 pounds per square inch; elastic limit 40,000 pounds per square inch; 10 per cent elongation in 2 inches, with a reduction of area of 14 per cent. Grade C has a tensile strength of 65,000 pounds per square inch; elastic limit 25,000 per square inch; 30 per cent elongation in 2 inches and 35 per cent reduction of area.

THE PAWLING & HARNISCHFEGER HORIZONTAL DRILLING AND BORING MACHINES.

The drill presses illustrated in Figs. 1, 2 and 3, represent a line of tools built by Pawling & Harnischfeger, Milwaukee. They are recommended for every class of drilling that can be done using drills from ⅜ inch or ½ inch up to the largest commercial sizes or 3 inches in diameter. Drills smaller than ⅜-inch may be used with careful handling but machines having the capacity of these are naturally not so well adapted to sensitive drilling. Fig. 1 shows the No. 2 direct motor-driven machine. The No. 1 tool is of similar though lighter construction and is built with a direct motor drive or with a change speed countershaft. The carriage of the No. 2 machine shown is similar to that of the No. 1 machine and differs from the carriages of the No. 3 and No. 4 machines shown in Figs. 2 and 3 respectively in that it is designed for traveling up and down on two round columns while the latter travel on the faces of box section columns.

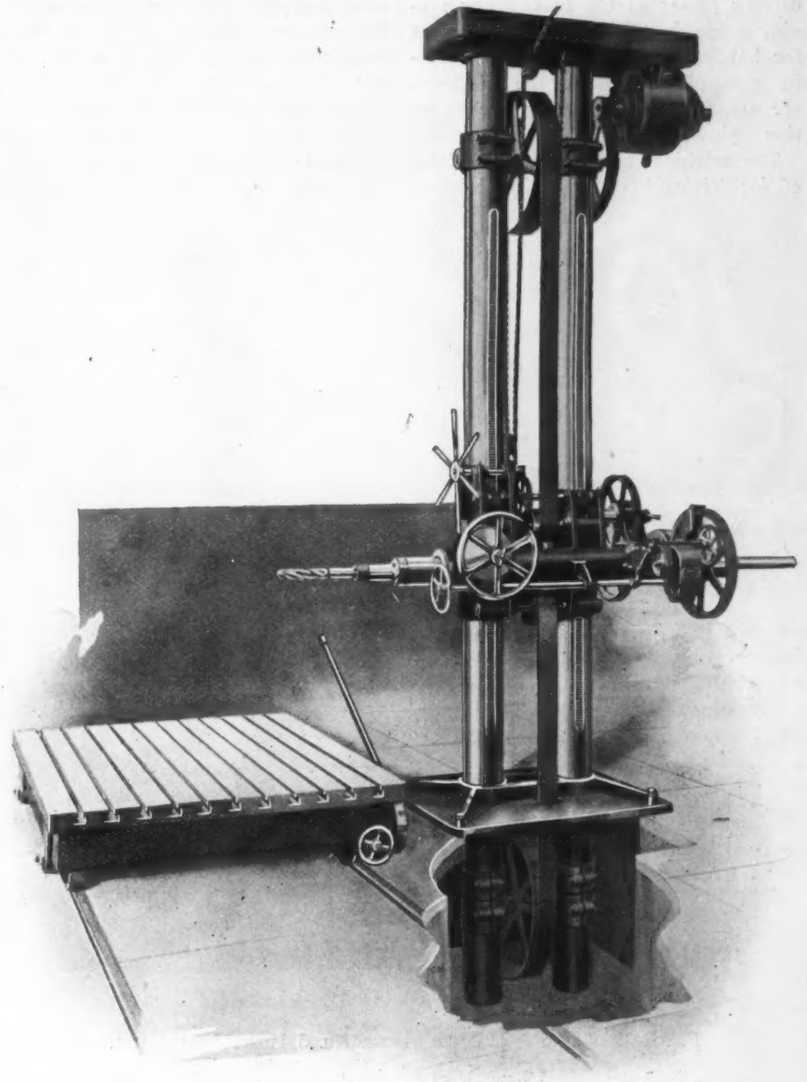


FIG. 1—PAWLING & HARNISCHFEGER NO. 2 HORIZONTAL DRILL.

The feed mechanism, spindle and main gearing parts for all machines differ only in dimensions.

The spindle is made of high carbon forged steel and is fitted to long bronze bearings which are so separated as to give the maximum of true alignment. The end thrust is taken by dust proof ball bearings. The spindle sockets of the No. 1 and No. 3 machine are Morse taper No. 5, which is the size of shank for a 3-inch drill. The No. 2 and 4 machines are made for Morse taper No. 6 which adapts

them to special drills over 3 inches in diameter. These machines will do all sizes of machine tapping and for pipe tapping the No. 1 and No. 3 will handle taps up to about 4 inches and the No. 2 and No. 4 up to about 7 inches cutting full threads. From this may be formed an idea of the driving power of the tools. For tapping some form of chuck is required for holding the tap but not necessarily a tapping chuck as the machines are arranged for reversing the direction spindle rotation.

The machines are particularly adapted for driving bars for boring, because of their rigidness, long horizontal spindle travel and method of supporting the spindle. Sufficient stability has been sought in the design to permit of boring and facing without chatter. The direct traverse of the spindle in either direction and the locking and unlocking of the power feed is made with one large handwheel. This attachment consists of a large area cone friction disc on the shaft and a pinion that meshes with a rack on the spindle sleeve. The disc is engaged with a worm gear or disengaged through hardened tool steel helices located on the hubs of the disc and handwheel. With the disc and worm gear locked the hand or power feed is made through the worm shaft. The disc is prevented from locking when it is desired to move the spindle independently of the feed by a few turns of the star nut outside of the handwheel.

The No. 4 machine has no table and is intended to be used as a portable tool where the work can not be brought conveniently to it. A clevis at the top of the column is provided for transporting the machine. A 7½ horsepower variable speed motor geared direct to cone friction clutches controls the travel of the column on the base, the vertical movement of the carriage and the spindle rotation through individual levers. The range of this machine is greater than that of the others, though all of the machines cover a large working area with one setting of the work, that area varying from 60 to 78 square feet.

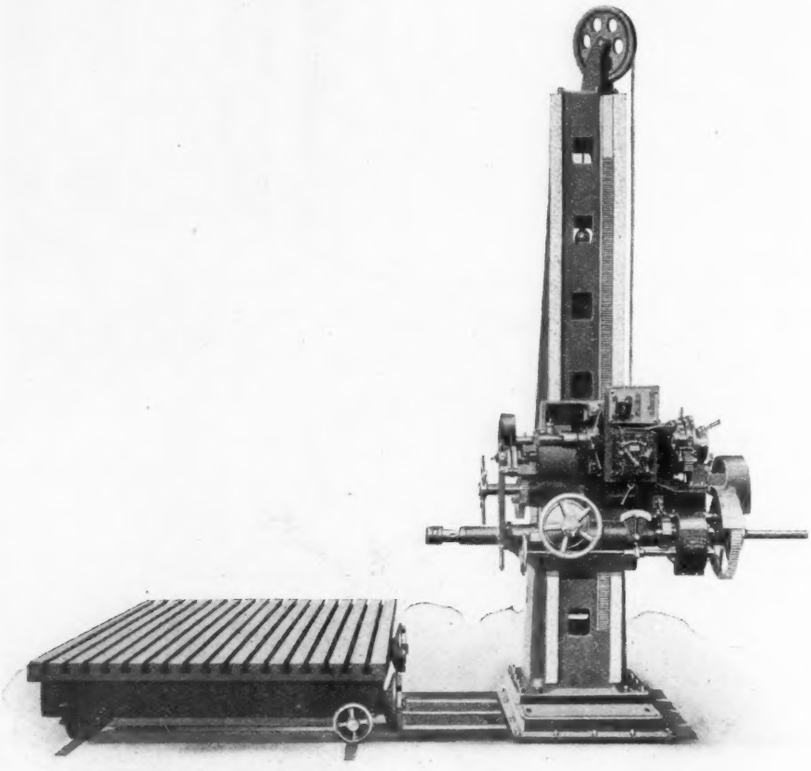


FIG. 2—PAWLING & HARNISCHFEGER NO. 3 HORIZONTAL DRILL.

For machining long structural shapes it is customary to use light trucks as trailers for the parts overhanging the machine table. Where much duplicate work is done special fixtures for receiving the work may be attached to the table, such as a turntable that will permit of the piece being revolved for machining on more than one side. The design of the No. 1 and No. 2 machines necessitates extending the round columns below the floor line to receive the idler pulley for the driving belt. With the No. 3 machine is furnished structural foundation I-beams for embedding in concrete. The base plate of the tool is bolted to these beams and also the rails for the table track.

NEW PLANT OF THE ROCKAWAY ROLLING MILL.

The Rockaway Rolling Mill, Rockaway, N. J., is now operating its new plant, built to replace the old works destroyed by fire Feb. 21, 1907. The new plant has a capacity of between 1,200 and 1,500 tons of rolled product per month, and is extremely complete and well arrranged as in rebuilding the company took advantage of the opportunity to incorporate in its design a number of desirable features lacking in the ordinary mill.

The main building is about 80 x 240 feet, with an L 70 x 100 feet. Foundations throughout are of concrete and sidings are of the best grade of galvanized sheet iron obtainable. To a height of about 10 feet removable iron doors are provided for throwing the buildings open during the summer season.

Three heating furnaces have been installed to supply the tandem of rolls, one 10-inch and the other 13-inch. The latter is direct connected with a Beggs engine, while the 10-inch mill is belt-driven. There are two engines on this mill, that on the roughing train being independent of the one driving the finishing train. A patent crab is provided to disengage the mill instantly from the engines, in case of accident at the rolls.

The entire plant is run on three shears. One, of the guillotine type built by the United Engineering & Foundry Co., Pittsburg, takes boiler plate up to 1 inch thick and 42 inches wide. Another now being installed will handle plate up to 1 inch thick at the rate of 400 inches per minute; this is located immediately beneath the unloading trestles. A third shear will cut billets up to 5 inches square, cold.

A siding of the Central Railroad of New Jersey runs along the entire side of the main building, the tracks being sufficiently depressed for loading purposes to bring the car floor on a level with the mill floor. A complete system of industrial tracks, operating by gravity, runs from the material yards through the plant and serves the loading floor. On that section

leading from the cooling bed and storage floor to the loading floor is located an automatic registering scale.

A concrete trestle west of the main building spans a series of bins for the storage of coal and sand, for which no rehandling is required, and for the storage of scrap. Rockaway is about 35 miles northwest of New York and commands low freight rates over the Central Railroad of New Jersey. The location is further favorable because of the excellent water supply, the plant being insured of an ample supply at all times from wells connecting with the Rockaway river. Labor conditions are also to be depended upon at this point.

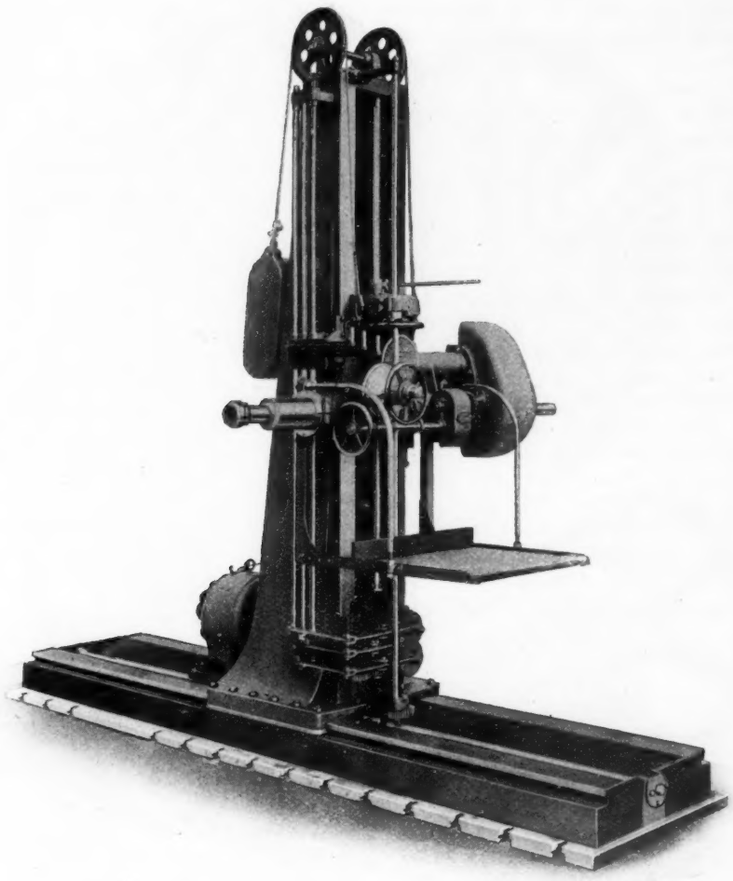


FIG. 3—PAWLING & HARNISCHFEGER NO. 4 HORIZONTAL DRILL.

The Rockaway Rolling Mill pays particular attention to the cleaning of all its scrap, and uses all long material which produces an iron absolutely clean and long fibered. A specialty is made of cold punched nut iron and bolt iron. Interesting results were recently obtained on a number of flats ¾ of an inch in thickness and 1 inch in width, picked at random from the regular run of the mill. These were to be used in nut manufacture and were intended to take a ½-inch hole, yet with one punch, cold, ⅞-inch holes were made throughout the sections without the slightest sign of fracture developing. A factor of importance in the production of bars which are absolutely straight is the cooling bed, which is close grated and is made up of sections which have been machined down until an absolutely true surface has been secured over the entire bed.

Edward Ehlers is president of the company, M. L. Houck, vice president and C. C. Grover, treasurer. The work of rebuilding the burned plant was begun in June; by January 6 it was ready for operation and since that time has been running full time on single turn.

Employes of the United States Steel Corporation subscribed recently for 50,000 shares of the Corporation's preferred stock at 87½ under the profit-sharing announcement. Since but 25,000 shares were offered by the management, the subscriptions of the men were cut in two.

A NEW CROSS FEED FOR SHAPERS.

The accompanying illustrations graphically compare the advantageous features of merit of the new front cross feed which Gould & Eberhardt, Newark, N. J., are putting on the market as an attachment to their well-known line of "high duty shapers." This new front cross feed is intended principally for tool room and die work where the job requires both down and cross feeds to follow a given outline.

FIG. 1—OPERATING THE OLD STYLE CROSS FEED ON SHAPER.

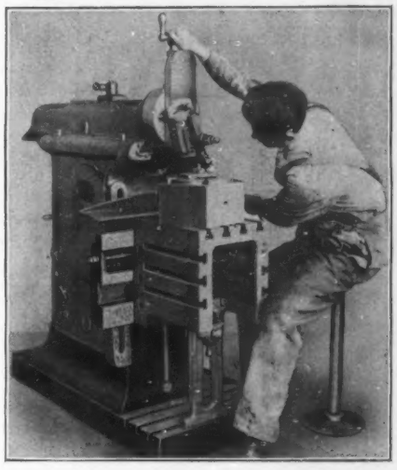


FIG. 2—OPERATING THE OLD STYLE CROSS FEED ON SHAPER.

Figs. 1 and 2 show the contortions ordinarily necessary with a shaper in order to use both feeds and keep an eye on the line. The new front cross feed which the manufacturers have

designated as "The Natural Way" is shown in Fig. 3. It is claimed that this feed will not only enable the workman to turn out better and more

FIG. 3—OPERATING THE NEW GOULD & EBERHARDT SHAPER CROSS FEED.

accurate work, but it also permits the taking of a less fatiguing position at the machine. This addition to the already long list of shaper improvements put out by Gould & Eberhardt, is patented, and controlled by them.

As shown by Fig. 3 and by the line drawing, Fig. 4, the new feed is

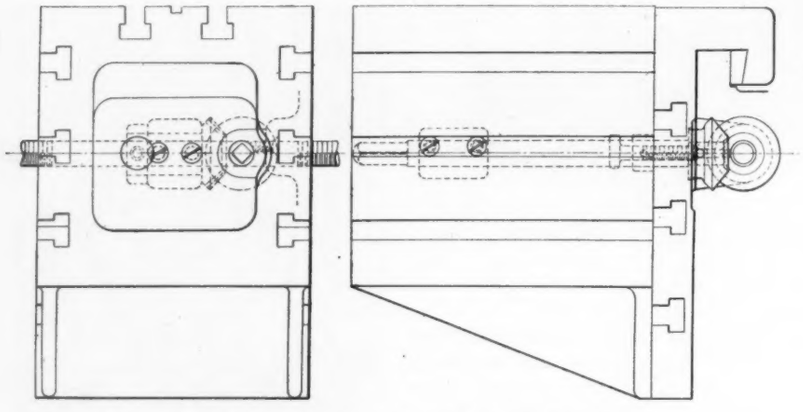


FIG. 4—NEW CROSS FEED FOR GOULD & EBERHARDT SHAPER.

actuated by a crank on a shaft projecting through the front of the shaper table. The shaft carries on its rear end a bevel gear, meshing with a corresponding gear on the nut on the feed screw of the table. The nut is carried in a bracket fastened by screws to the back of the table. The details are clearly shown by Fig. 4, and further comment is unnecessary.

AN UNUSUALLY LARGE TOGGLE DRAWING PRESS.

The accompanying illustrations show a toggle drawing press of great size and capacity, together with some of the details of operation, which has just been built by the Toledo Machine & Tool Co., Toledo, O. It is believed to be the largest ever built of its type, and is intended for the manufacturing of a general line of deep stamping from steel or other sheet metal. The particular purpose for which it was built is the manufacture of brake drums and casings for automobiles, and it can be used for steel closet tanks, sinks, bath tubs and similar work. A relatively small amount of power is required to operate the machine.

An 8-inch belt is used, although the original intention was to use a 10-inch double belt. If desired a direct-connected motor drive or engine drive can be used.

The reduction in the amount of power required is obtained by the low friction in the new patented movement used for operating the toggles and blank holder slide. This movement, which is shown in two positions in Figs. 1 and 2, is different from the slide bar and head movement common in other presses of a similar type. Referring to the illustrations, the crank A which is keyed to the outer left hand end of the main crank shaft is connected to the yoke H, which is suspended between the levers F and G. These levers are pivoted to the side of the main housing of the machine. Fitted to the yoke H are two levers I, one end of each being attached to the bell cranks D. The opposite end of these bell cranks are attached to the links C which connects with the cranks B keyed to the rocker arm shaft, which connects directly with the toggle movement of the blank holder.

All the above parts are made from

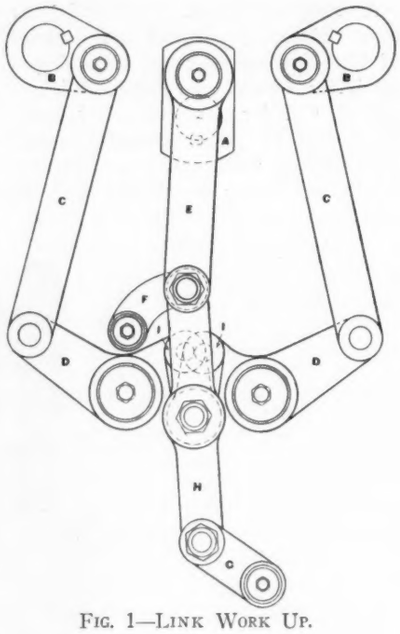


FIG. 1—LINK WORK UP.

steel castings, each bearing being bushed with bronze. The movement of the crank B is practically nil during over 90 degrees of the circle travel at the lowest point of the crank A. The blank holder of the press operated by the inner toggle movement is

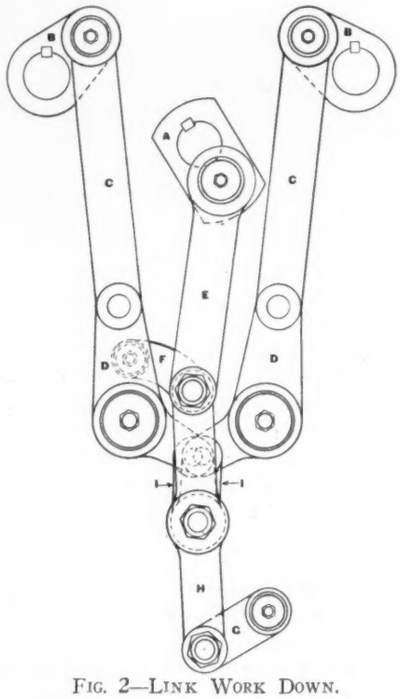


FIG. 2—LINK WORK DOWN.

by this movement given the greatest possible dwell in the draw, redrawing or reducing operations.

Lubrication is supplied to all joints

of the outer movement through the end of each main bar pin by means of a self-feeding oil or compression cup. The movement obtained is easy and smooth and the little motion necessary to the greater number of the joints eliminates practically 80 per cent of the usual friction in toggle motions.

A powerful friction clutch serves to operate the machine, which is, therefore, under complete control of the operator at all points of the stroke of both plunger and blank holder. It is estimated that a resistance is obtained on the blank holder of over 2,000 tons pressure. The press as illustrated is capable of drawing cold steel plate as heavy as 5/16-inch thick. The principal dimensions of the machine are as follows:

Width between uprights, 57 inches; distance bed to blank holder, stroke down and adjustment up, 24 inches; distance bed to plunger, stroke down and adjustment up, 25 inches; stroke of blank holder, 18 inches; stroke of plunger, 26 inches; diameter of balance wheel, 84 inches; weight of balnace wheel, 3,000 pounds; size of belt pulley, 50 x 10 inches; size of main gearing, 124 x 14 inches; ratio of gearing, 50 : 1; diameter of shaft at crank bearing, 13 inches; floor space required, 100 inches deep, 176 inches wide; total height from floor line, 21 feet; weight complete, 175,000 pounds.

This press was built for the A. O. Smith Co., Milwaukee, Wis.

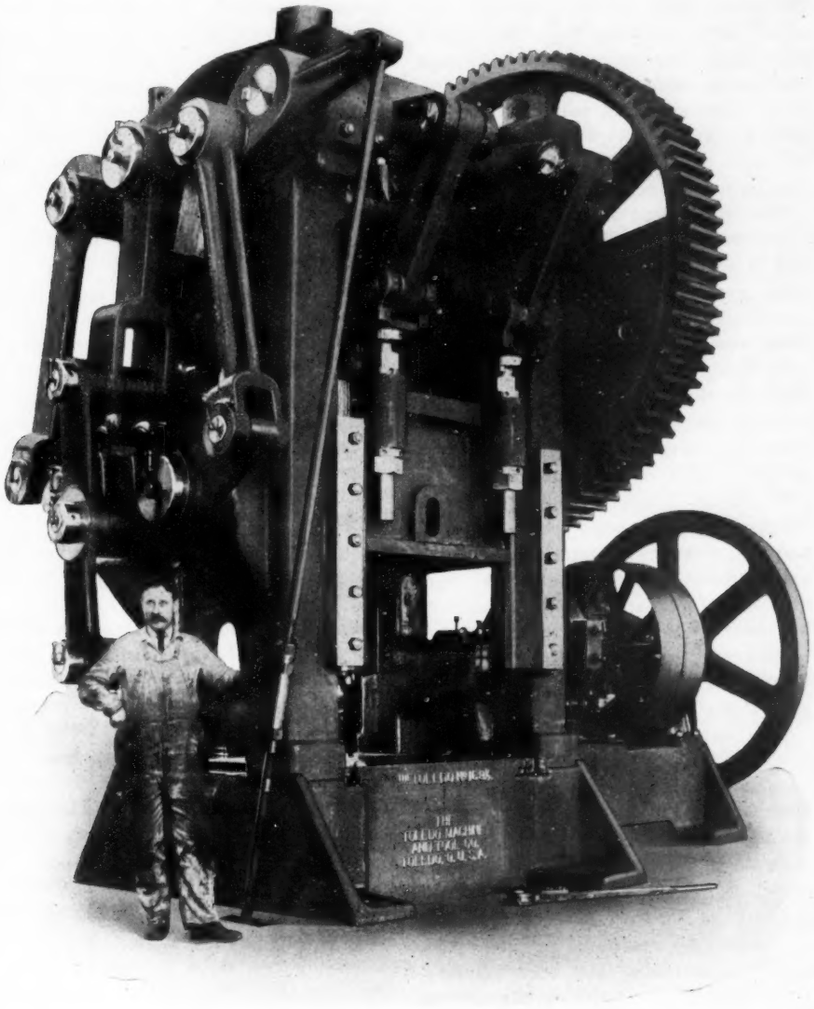


FIG. 3—TOLEDO TOGGLE DRAWING PRESS.

The returns of the committee of car efficiency of the American Railway Association show that on February 5 the total number of idle cars on the railroad lines of the United States and Canada was 343,217. A few small shortages of cars were reported, aggregating 1,085 cars for the entire association.

BOOK REVIEW

Specifications and Contracts. By J. A. L. Waddell and John C. Wait. New York. The Engineering News Publishing Co. 6½ x 9½ inches. 169 pages. Cloth. Supplied by THE IRON TRADE REVIEW for $1.00.

This book comprises a series of lectures delivered to the senior class of the Rensselaer Polytechnic Institute on the subject of specifications and contracts by Mr. Waddell together with notes on the law of contracts by Mr. Wait. The specifications dealt with relate largely to civil engineering problems, but the book should prove of great value to engineers in the other branches of the profession, inasmuch as Mr. Waddell gives the general requirements for a good specification, which are the same no matter what the subject of the work may be, that is, the explaining clearly and in detail what work is to be done and how it is to be done. The author lays great stress on the fact that extreme care must be used in the drawing up of a specification, so that there is not the slightest possibility of the meaning of the engineer being misunderstood, and brings out clearly the fact that most law-suits in regard to improper fulfillment of specifications and contracts are due to ambiguous wording of these instruments. The scheme of the book is the presentation of a number of typical specifications and contracts which have been drawn up by the author in the course of his engineering practice. These are given clause by clause, with comments by the author on each clause, showing the particular reason why it is worded as it is. The notes on the law of contracts are comprised under 62 various headings, dealing with all the points that are liable to be disputed by either of the parties to the contract. The book is printed with the side-headings in the margins, enabling the reader to use the book as a reference work and it is thoroughly indexed. It is a work of great value to any person who has to do with writing of contracts and specifications and should be in the hands of every engineer who is called on to draw up these instruments.

Reid & Brown, the oldest jobbing foundry firm of Toronto, has dissolved partnership. The business will be continued by Hugh Reid and his three sons, who will make extensive additions to the plant and engage in the manufacture of structural iron and structural steel castings.

OPTIMISM

AND GOLDEN RULE NEEDED IN BUSINESS,

Said Willis L. King at the Annual Banquet of the New England Iron and Hardware Association.

Boston, Feb. 26.—The annual banquet of the New England Iron & Hardware Association was held this evening at the Hotel Somerset, nearly 200 members and their guests participating. The menu was choice, there was hearty good fellowship in all the proceedings and the after-dinner speaking was excellent.

Among the guests was Hon. George A. Hibbard, mayor of the city, who was called upon early to extend the greetings of the municipality, his stay being brief on account of other engagements. After the dinner, President R. M. Boutwell, before introducing the other speakers, expressed the gratification of the members at the presence of so many who came from a distance to evince their continued interest in the association. He referred to the business depression, severely felt by the trade, and hoped that the wheels of industry would soon be started again with their former vigor. "A little better business poise and more optimism in official circles," he added, "I believe would best assist us to recover from this business uncertainty, and the members of this organization would be found marching in the front ranks, leading the way onward to an era of prosperity such as we have never known before."

William L. King, vice president of the Jones & Laughlin Steel Co., Pittsburg, was then introduced as the principal speaker, and delivered a timely address on the business outlook. He had hesitated, he said, in accepting the invitation to speak, but had finally concluded that the kindred interest of all present in the great steel industry, its vicissitudes in the past and its prospects in the future, would permit him to "talk shop" to some extent. He reviewed the growth of the industry from its infancy to the time when the great United States Steel Corporation was formed, the alternating periods of advancement and stagnation, the lack of stability in prices and the extremes of prosperity and depression. The recent history of the trade he characterized as the most interesting and wonderful part of the story of steel.

"The combination of 100 separate and distinct firms or companies into one organization," he said, "was so stupendous and unheard of that the public and independent steel makers had apparently good reason for alarm. The public feared a monopoly with attendant high prices, and outside steel makers saw visions of drastic competition.

"Well, we are all here yet, and all fairly healthy! The Corporation has run along with, and not against, economic laws, knowing that these apply to a large corporation as well as to a small one. After six years of operation, I am prepared to say that they have shown their right to exist, and I am glad of this opportunity to make this public statement.

"But the Corporation has intelligent competitors worthy of their respect, and if they thought at first that they had, or might have, a monopoly, they would not know what to do with it. That word is not popular now.

"Leaving the past, however, our interest at this time centers in the anxieties of the present and hopes of the future. It is perhaps idle to speculate on the extent or particular causes of our present financial and commercial depression. In general terms, over-expansion, over-legislation, cupidity and extravagance may justly bear the burden. But fortunately all the contributing causes are correctible. The correcting process has been going on for some months, and I feel that we are well along in our convalescence.

"We are suffering mainly from a disease called 'pessimism.' If we could be given a good strong dose of a medicine called 'optimism' tonight, the business situation would change tomorrow morning. I know that when the change does come, this great country will go forward with more vigorous strides by reason of its rest.

"This chastening has been salutary. I feel that we are entering the 'golden age' of business; perhaps I should say the 'golden rule age,' for that is what it means. All over the land there is a sentiment that the moral right of your neighbor is pre-eminent. His legal rights under the constitution do not measure your whole duty to him. He may be a competitor or a consumer. It does not matter; he must be treated decently.

"The steel manufacturers of this country want to treat the public fairly, to make prices based on a fair return over cost, having a just regard for their stockholders and workmen, and I shall fail of my purpose tonight if I do not enlist your enthusiastic support in this great movement, for it will surely bring about that return of prosperity which we so urgently desire and need at this moment.

"I do not hesitate to say that prices for steel products are now fair and reasonable, based on their cost. It is not the price of steel, but doubt of the financial ability to buy it, and want of confidence in the future, that has caused the lack of orders, and any reduction in price would not, in my opinion, increase the demand, but would still further unsettle values and confidence.

"It can hardly be expected that I should miss this opportunity to say something about the tariff, but there is really nothing new to be said. I see no necessity for any revision, but the younger generation, who have never suffered under free trade or inadequate protection, seem to be ready for a revision, and I suppose must learn their lesson by experience.

"In closing I want you to remember me as one who puts his country above selfish or partisan motives, as one who believes in the justice and patriotism of the American people and in their recuperative genius. I want to leave with you a message of confidence in the future, under the guidance of Almighty God, who has watched over us from the beginning, and made us a great people."

Hon. Edgar T. Brackett, ex-senator, New York, was next called upon, and launched a Hughes boom for the presidency that was received with considerable evidence of approval. Brief addresses were also made by other speakers. The occasion was one of the most memorable in the history of the organization.

Welding Plant Starts.—The American Welding Co., Carbondale, Pa., is to begin operations Mar. 1 in a new plant just completed at a cost of $100,000. This occupies a site of three acres and is equipped with its own gas works. All-welded steel cylinder work will be done. This company succeeds to the business of the Morton Iron Works, 114 Green street, Brooklyn, N. Y., which will go out of existence at that time. Officers of the new company are the same as of the old: Charles L. Rowland, president; Frank A. Dempsey, secretary and treasurer, and A. P. Trautwein, vice president. The work of removing the Morton equipment to the new plant is now well under way.

Frederick H. Eaton, president of the American Car & Foundry Co., has been chosen a director of the Seaboard National Bank, New York City.

LARGEST GAINS.

Empire Steel & Iron Co. Report—Gary Policy Commended.

Gains in net earnings and surplus, the largest in its history, were shown in the annual report of the Empire Steel & Iron Co., presented the stockholders at the meeting in Jersey City, N. J., Feb. 26. The following statement was submitted:

		Increase.
Total net earnings	$602,403	$231,462
Improvement and depreciation	85,147	14,901
Net profits	517,256	216,561
Total deductions	69,540	69,540
Balance	447,716	147,021
Preferred dividends	150,000	87,500
Surplus	297,716	109,521

The company's total assets as of Dec. 31, 1907, amounted to $5,413,171 or $330,062 smaller than those recorded Dec. 31, 1906. In his address President Leonard Peckitt said:

The directors have been successful in placing the finances of the company in such condition as to carry out important plans with regard to radical improvement of the properties, not only without increasing the company's indebtedness and without asking stockholders to subscribe additional capital, but with the financial obligations reduced and the working capital materially increased. They decided to sell the Allegheny Ore & Iron Co. stock held by the company, because the company lacked funds to finance it, and the investment was rendering no return. This stock was sold on a favorable basis by virtue of the extensive ore lands held by the Allegheny company.

After closing the books at the end of the year, there was shown a profit and loss surplus of more than $1,000,000. The full dividend of 6 per cent was paid on the preferred stock and the directors considered the advisability of making a payment on the accumulated dividend, now amounting to 18 per cent, but in view of the conditions existing in the money market toward the close of the year, rendering collections difficult, and in view of the necessity of carrying a large stock of material at the furnaces, it is deemed wise to retain this money in the business until the return of more normal conditions.

It is impossible for us to make any predictions as to business for the present year, but in closing this report, we wish to say that in our opinion this company and the iron and steel trade in general owe a debt of gratitude to Judge E. H. Gary and his associates in the United States Steel Corporation for the influence which they have recently exerted in an effort to prevent what might otherwise have been a complete demoralization in the iron and steel business of the country.

Experience oft repeated has evidenced the untold damage caused to business in general by endeavoring to force sales of iron in times of depression. The continuation of operations in the face of adverse conditions and the consequent cutting of prices, never has resulted in good to any branch of the business, and we commend heartily the wisdom of the plan for all interests, both buying and selling, to join their efforts toward maintaining prices of iron and steel products.

JAPANESE GOVERNMENT FOUNDRY HAS PROVED FAILURE.

Mr. Nakamure, superintendent of the Japanese government's foundry at Wakamatsu, replying to the budget committee during a debate in the house, admitted that the great enterprise was almost a hopeless failure because of the enormous rise in the price of coal and labor. The government cannot compete with imported iron and steel, he said, having to rely on Chinese ore and without a tariff equal to that of the United States.

National Carbon Earnings.—The following report of the net income of the National Carbon Co. for the year ending Jan. 31, 1908, was made at the recent annual meeting at Trenton, N. J.: Net income, $924,801.88, which was disposed of in this manner: Dividend on preferred capital stock, 7 per cent, $315,000; dividend on common stock, 4 per cent, $220,00; charges to depreciation account, $350,000; accounts charged off, $5,050.34; balance to profit and loss account, $34,751.54; total, $924,801.88.

IRON ORE SHIPMENTS AND PRODUCTION OF IRON AND STEEL PRODUCTS BY UNITED STATES STEEL CORPORATION A ND INDEPENDENT INTERESTS.

(From annual report of American Iron and Steel Association.)

Iron ore shipments from Lake Superior and the total iron ore production in the calendar year 1906; also coke production in the same year.	By U. S. Steel Corporation.	By independent companies.	Total shipments and production.	Percentage U. S. Steel Corporation.
Shipments of iron ore from the Lake Superior region in 1906.....gross tons.	20,885,774	17,637,665	38,523,439	54.2
Total production of iron ore in 1906.....gross tons.	20,645,148	27,104,580	47,749,728	43.2
Production of coke in 1906.....net tons...	13,295,075	23,106,142	36.401,217	36.5
Iron and steel actually produced in the calendar year 1906. Gross tons.	**Production U. S. Steel Corporation.**	**Production independent companies.**	**Total production. Gross tons.**	**Percentage U. S. Steel Corporation.**
Bessemer, basic, low-phosphorus, foundry, forge, ferro-silicon, and other pig iron...	11,061,794	13,939,755	25,001,549	44.2
Spiegeleisen, ferro-manganese, ferro-phosphorus, and Bessemer ferro-silicon.....	205,583	100,059	305,642	67.2
Total pig iron, including spiegel., ferro-mang., ferro-phos., and Bessemer ferro-sil.	11,267,377	14,039,814	25,307,191	44.5
Bessemer steel ingots and castings.....	8,072,655	4,203,175	12,275,830	65.7
Open-hearth steel ingots and castings.....	5,456,544	5,523,869	10,980,413	49.6
Total Bessemer and open-hearth steel ingots and castings.....	13,529,199	9,727,044	23,256,243	58.1
Bessemer steel rails.....	1,995,868	1,795,591	3,791,459	52.6
Structural shapes.....	1,157,271	961,501	2,118,772	54.6
Plates and sheets, including black plates for tinning but excluding nail plate.....	2,354,790	1,827,366	4,182,156	56.3
Wire rods.....	1,342,391	529,223	1,871,614	71.7
Bars, skelp, nail plate, open-hearth and iron rails, and other finished rolled products..	2,582,626	5,041,841	7,624,467	33.8
Total finished rolled products, including rolled forging blooms and billets.....	9,432,946	10,155,522	19,588,468	48.1
Wire nails.....kegs of 100 pounds.	7,524,114	3,962,533	11,486,647	65.5

QUEBEC BRIDGE DISASTER.

Special Commissioners Report Its Cause Defect in Basis of Design.

Toronto, Canada, March 2.—The report of the special commissioners appointed to investigate the Quebec bridge disaster has been presented to the minister of railways and will be submitted to parliament this week. The conclusions of the commission are that the wreck was not due to defects in either material or construction, but to a defect in the basis of design. The construction in its principal details was carried out with care, but in proceeding on the lines of the general formula now adopted as a standard in bridge construction, the architects seem to have lost sight of an extremely important point, that of providing support adequate for the highest pressure on the great central span. In an enterprise greater than ever before attempted in bridge construction, the engineers only considered the usual formula of such work. Though the details were carried out with the greatest care following the best principles of modern bridge construction, the weight of the central portion was too much for the supports. No defect was discovered in the materials furnished by the Phoenix Bridge Co. The plans were traced by the engineer-in-chief of the Phoenix company and approved by Mr. Cooper as consulting engineer of the Quebec Bridge Co., and after passing through their hands were approved by the Canadian government. In the carrying out of the plans, the commission found no negligence or reason for criticism. It renders no judicial decision as to the responsibility of the government or the Phoenix company for the disaster.

Judge Anglin on Feb. 26 made an order for the winding up of the Aylmer Iron Works, Ltd., Aylmer, Ont., on the petition of the Sovereign Bank of Canada, creditor to the amount of $46,958. The total assets of the company are given as $96,812. E. R. C. Clarkson was appointed interim liquidator. This action was the result of the failure of the Sovereign Bank to meet its obligations and the taking over of its assets by other Canadian banks.

The Nova Scotia Steel & Coal Co. has been for some time prospecting for iron ore at the head of Whycocomagh bay, N. S., and has struck a good vein. After tunneling into the mountain 50 feet the company's projectors found solid ore assaying 49 per cent iron. The company intends building a tramway and piers for shipping the ore to the plant at Sydney mines.

The annual report of the Dominion Coal Co. shows an output of 3,541,253 tons of coal for 1907, as compared with 3,552,746 tons for 1906. Net earnings were $2,094,539, as against $1,137,370, leaving a balance of $1,002,368 after payment of dividends and charges. The report refers at length to the suit brought against the company by the Dominion Iron & Steel Co., but holds out little hope of an amicable settlement being arrived at, stating that as no genuine response has been made to numerous overtures for a settlement on equitable lines, the only alternative to complete surrender to unreasonable demand is to prosecute the appeal to the imperial privy council.

The Imperial Stove Works, Ltd., has been incorporated by Salem Coons, Andrew Broder, William Duke and others with an authorized capital of $100,000 and head office at Morrisburg, Ont.

Amos B. Cunningham, Wesley A. Collier, Matthew A. Morrison, Robert J. Kidd and Sydney T. Medd have organized the Collier-Cunningham Co., Ltd., with $40,000 capital to carry on business as electricians and manufacturers of electrical appliances at Petersburg, Ont.

The Canadian Crocker-Wheeler Co., Ltd., Montreal, with an authorized capital of $250,000 has been incorporated to manufacture metals and do a general foundry and machine business by Russel A. Stinson, Frederick J. Bell, F. E. Lowell and others.

Making New Records.—High records of production in the manufacture of cotton ties have recently been made at the Glassport, Pa., plant of the Pittsburg Steel Co. Up to Feb. 26, the high mark of the plant in a single turn was 1,708 bundles of cotton ties. On that date, however, the day force established a new record of 1,729 bundles. The night turn men, not to be outdone, advanced the record to 1,793 bundles, where it now stands. The day force has made a strong effort to eclipse the high mark but in this it has as yet been unsuccessful, although on Feb. 27 the men raised their own record to 1,751 bundles.

LARGE CONTRACTS

Awarded to the Pittsburg Valve, Foundry & Construction Co.

J. D. Robertson, general sales manager of the Pittsburg Valve, Foundry & Construction Co., Pittsburg, has just returned from Alabama where, with the assistance of the company's southern representatives, the Young & Vann Supply Co. of Birmingham, Ala., he secured a large contract from the Woodward Iron Co., Woodward, Ala., for the piping installation for 13 boilers and four engines. The Woodward company has remodeled its No. 1 furnace, and in addition to the six boilers now in service, is installing seven new boilers of the Wick type. It is expected to have the furnace ready for blast not later than June 1. The Young & Vann Supply Co. began business January, 1907, and has been successful in closing several large contracts for high pressure piping. Both Messrs. Young and Vann are well known in the southern field, having been associated with one of the largest supply houses in the Birmingham district for the past 18 years. The Pittsburg Valve, Foundry & Construction Co. has also secured the most complete piping contract ever placed in the Pittsburg district, comprising the piping installation in the new open-hearth steel plant being built by the Pittsburg Steel Co., Monessen, Pa. It includes all the steam piping running from 24 inches down, the exhaust piping running from 72 inches down, and the main water piping for the plant, 30 inches and smaller. There are to be installed 15 500-horsepower Sterling boilers, three large mill engines and three cross-compound electric generator engines, together with necessary pumps for feed water and mill supply. The plant will have eight open-hearth furnaces and 51 gas producers. The pipe has been ordered for the most up-to-date construction, being specially designed by the Garrett-Cromwell Engineering Co., Cleveland. In this contract the Pittsburg Valve, Foundry & Construction Co. will install all its own make of valves, separators, exhaust relief valves and other specialties. It is pushing the work as fast as possible, as the open-hearth steel plant is under contract to be ready for operation early in June.

The Seneca Chain Co., whose plant at Mansfield, O., has been operating at capacity, shipped 344,000 chains during the month of January. Part of the shipment of 1¼-inch steel chains went to Panama to be used on canal work, the chains weighing 1,500 pounds to the 100 feet.

CLOSED HONORED LIFE.

Death of Lewis Hazelius Taylor in His 97th Year.

Lewis Hazelius Taylor, honorary president of the Taylor Iron & Steel Co., died at his home "Solitude," High Bridge, N. J., Feb. 18. He had celebrated the 97th anniversary of his birth Jan. 29, retaining, until a few weeks before his death, remarkable bodily health and vigor of mind.

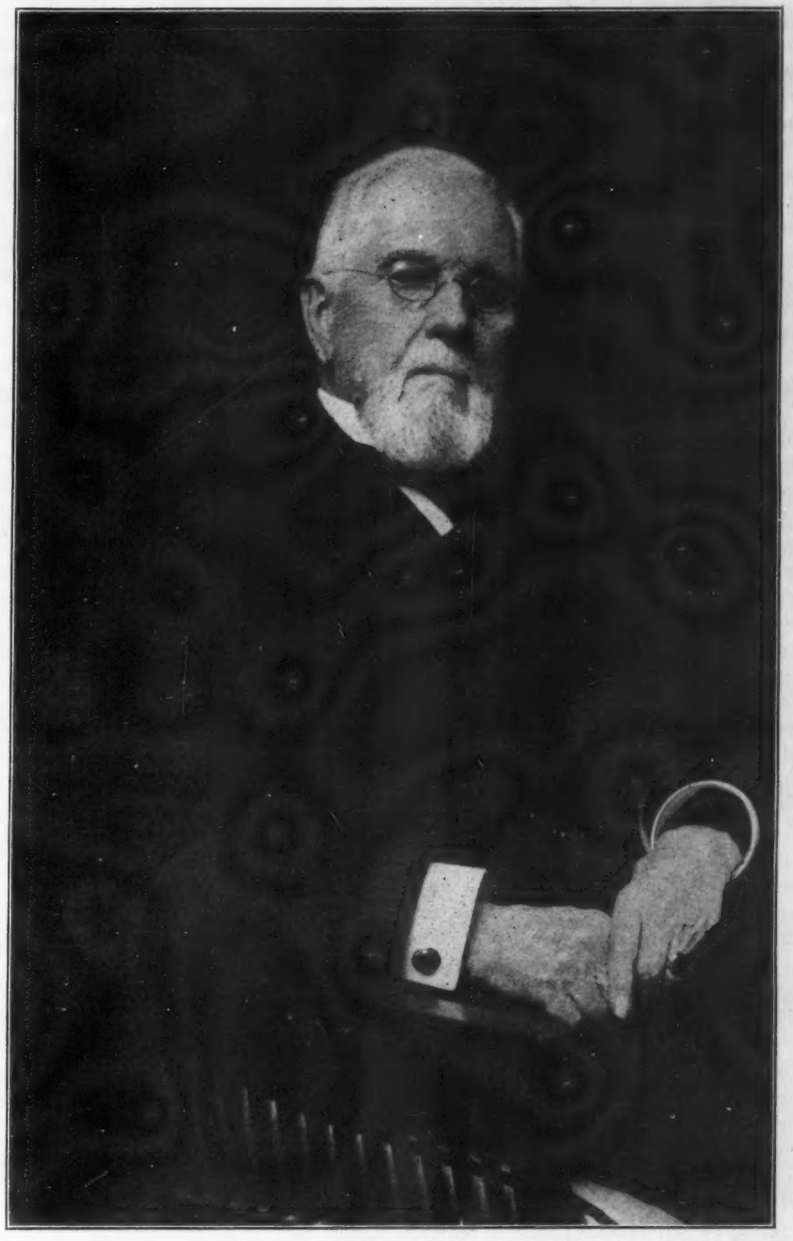
Mr. Taylor was president of the Taylor Iron Works from its organization in 1868 until it was merged into the Taylor Iron & Steel Co., in 1891, and he was the first president of the latter company, serving until 1905, thus making his term of office in all 36 years. Since 1891, the Taylor Iron & Steel Co. has manufactured manganese steel under exclusive patent rights in America from the Robert A. Hadfield system, Sheffield, Eng. Associated with his father, and active in the reorganization of the company, was his eldest son, William J. Taylor, an engineer of ability and inventor of the Taylor gas producer and the Taylor fused steel tired wheel.

The passing of Lewis H. Taylor removes a figure unique in any circle and honored in many—a gentleman of the old school and an enthusiastic advocate of modern methods for progress in business and community life. He recalled the days of stage coach travel and freight service by wagon, and in middle life assisted his friend, E. C. Knight, and others, in building a rival road to the Pennsylvania system between Philadelphia and New York, when the famous "frog war" resulted in victory for the Delaware & Bound Brook railroad, later a part of the Reading interests. The company of which he was so long the highest official made projectiles for every war from the Revolution to the Spanish-American war in Cuba.

He was educated by private tutors at home, later studying under the care of his uncle, Ernest Lewis Hazelius, superintendent of Hartwick Seminary, New York. During his long life he retained the keenest interest in all outdoor sports, taking part in them himself, hunting, fishing and camping until within recent years. During the '49 gold fever, he traveled with his brother, George, to California by way of the Isthmus of Panama. The brothers engaged in the foundation work of building the city of San Francisco, furnishing lumber for the great wharves.

In 1835, Mr. Taylor's marriage to Jane C. Johnston, of Philadelphia, united two families distinguished in colonial, civil and military life. Of their eight children three are now living, the youngest son, Lewis H. Taylor Jr., of Philadelphia, bearing his father's name.

Mr. Taylor was held in warm affection and the highest esteem by his employes and fellow-townsmen, contributing generously to the cause of education and the work of the church.



LEWIS HAZELIUS TAYLOR.

Two Thousand at Work.—The Standard Sanitary Mfg. Co., Pittsburg, manufacturer of plumbers' supplies, has put a force of 2,000 men at work at its Allegheny and New Brighton, Pa., plants, putting the company upon an operating basis of about two-thirds capacity. The two plants had been idle since December. Though the company reports business conditions are still quiet, the approach of the building season and consideration for the needs of its employes have induced the resumption of operations at this time.

Coke production in Alabama in 1907 aggregated 3,096,722 tons, according to State Mine Inspector Gray. The production by counties was: Jefferson, 2,648,076 tons; Walker, 107,197 tons; Tuscaloosa, 337,417 tons; Bibb, 4,032 tons.

Dull Week Throughout

Opening the week with a record for the date of the smallest number of shares of the year, and with price changes insignificant, the market all week continued to show weakness. Operations last Saturday were concluded with the general market in a weakened condition. Listlessness in general industrial and railroad stocks was the prevailing characteristic of the week, the movement of prices being within a very narrow range. The average change in 20 railroad stocks two days of the week was ⅛ of 1 per cent; the largest change in the average for any one day of the week was ½ per cent decline on Tuesday. Steel and iron stocks continued the most of the week to show strength, declining slightly finally through sympathy with the rest of the market. In the middle of the week, rumors that the Amalgamated Copper Co. has acquired additional properties in the Butte camp, coupled with declarations of sale of 80,000,000 pounds of copper to Europe, caused the copper stocks to rise perceptibly. The stronger position of coppers was maintained the remainder of the week. The total sales of stocks for February were the lightest, excepting Nov. 1, in any month in four years. Compared with January, there was a decline of 40 per cent. Bond sales also showed a loss from January, the aggregate being below the February average of recent years. Bank exchanges in the United States last week showed a decrease of 30 per cent below the same week two years ago. The total was, however, larger than in any preceding week of February. The weekly bank statement was not regarded as particularly favorable. The actual figures of the clearing house banks showed a decrease in the surplus of $5,282,925; an increase in loans of $13,132,900, and an increase in deposits of $15,795,300, the ratio of reserve to deposits being 27.3 per cent. The trust companies showed a decrease in loans of $1,107,300; an increase in deposits of $2,873,500, and an increase in reserve of $4,796,800, the percentage of reserve being 26.4. State banks showed a decrease of nearly a million in loans, and over $600,000 in deposits. Non-reporting state banks showed a decrease in loans of $1,200,000, and an increase in deposits of $3,250,000. Secretary Cortelyou's call for the return of $35,000,000 deposits in national banks tended to harden the time money market. The total number of shares sold during the week was 1,614,710, compared with 2,472,597 last week, and 5,802,150, the same period last year. The total amount of bonds, aside from government bonds, sold, was $14,008,000, compared with $9,509,000 last week, and $7,868,000, for the same period a year ago. The fact that the gold in the United States treasury passed the billion dollar mark Feb. 26 was made the subject of a congratulatory speech in congress by Mr. Boutell, of Illinois.

Financial Notes.

General Electric directors have declared the regular quarterly dividend of $2 a share, payable April 15 to stock of record March 4. Books do not close. Railway Steel Spring directors declared the regular quarterly dividend of 1¾ per cent on preferred stock for the quarter ending Feb. 29, payable March 20. Books close March 10 and reopen March 21.

Copper Stocks.

Boston.—Butte Coalition closed 19½, a net gain of 1⅝; Calumet & Arizona closed 100½, a net gain of 1½; Calumet & Hecla closed 631, a net gain of 21; North Butte Mining closed 49⅞, a net gain of 6⅞; Quincy Mining closed 83, a net gain of 4.

New York.—Amalgamated Copper closed 50¾, a net gain of 1¾.

Shipments of coal and coke originating on the Pennsylvania Railroad Co.'s lines east for the week ending Feb. 22 show 866,106 tons, a decrease of 200,373 tons compared with the same period last year. For the portion of the year Jan. 1 to Feb. 22 the shipments aggregate 6,339,652 tons, a decrease of 1,947,257 tons compared with the same period in 1907.

THE LEADING INDUSTRIAL SECURITIES.

	Clos'ng Quo Feb. 29	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	6	.....	Sept. 3	19,820,000	.....	.....	.....
Allis-Chalmers pr	17	.....		16,150 000	7 cum	1¾ Q.	Feb., 1904
American Can	4⅝	+ ⅝	Feb. 3	41.233.300	.....	.....	.....
Am. Can pr	46½	+ ½		41,233,300	7 cum	1¾ Q.	Jan., 1908
Am. Car and Fdy	26¼	— ⅜	June 25	30,000,000		1 Q.	Jan., 1908
Am. Car and Fdy pr	84¾	.....		30,000,000	7 n. c.	1¾ Q.	Jan., 1908
American Loc	32	— ⅝	Oct. 20	25,000 000	5	1¼ Q.	Feb., 1908
American Loc. pr	90	+ ½		25,000,000	7 cum	1¾ Q.	Jan., 1908
American Ship	50	.....	Oct. 14	7.600.000	4	1	Dec., 1907
American Ship pr	94¾	— ¼		7,900,000	7 n. c.	1¾ Q.	Jan., 1908
Am. Steel Foundries	5⅞	+ ⅛	Oct. 6	15,810,000	.....	.....	.....
Am. Steel Foundries pr.	30¼	+1⅛		17.240.000	6 cum	2½	Aug., 1904
Barney & Smith	65	.....	June 2	2,000,000	4	1 Q.	Sept. 1907
Barney & Smith pr	105	.....		2,500 000	8 cum	2 Q.	Sept. 1907
Bethlehem Steel	13¾	— ¼	April 7	14.862.000	.....	.....	.....
Bethlehem Steel pr	38½	.....		14,900,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	27½	.....	March 17	45,000,000*	6	1½ S. A.	Aug., 1907
Cambria Iron	43½	.....		8,468,000*	4	2 S. A.	Apr., 1904
Chicago Pneumatic Tool	23	—1¼	Feb. 17	6,145.800	4	1 Q.	Oct., 1907
Colorado Fuel	16⅜	— ⅝	Oct. 19	34.235,500		3⅜	Apr., 1903
Crucible Steel	5½	+1½	Oct. 21	24.578.400	.....	.....	.....
Crucible Steel pr	37	+4		24,436.500	7 cum	1 Q	Dec., 1907
Empire Steel	8	.....	Feb. 26	2.281.400	.....	.....	.....
Empire Steel pr	40	.....		2,500,000	6 cum	3 S. A.	Jan., 1907
Fay & Egan	140	.....	Feb. 18	1.000.000	6	1½ Q.	July, 1907
Fay & Egan pr	130	.....		1,000 000	7 cum	1¾ Q.	Aug., 1907
General Electric	116	+1	May 12	65,167.400	8	2 Q.	Jan., 1908
Harbison-Walker	12½	.....	Jan. 20	18,000,000		½	Oct., 1907
Harbison-Walker pr	70	+1		9.600,000	6 cum	1½ Q.	Oct., 1907
International Pump	18¼	— ⅞	June 2	17,787,300		1	Apr., 1905
International Pump pr	67⅞	+2⅝		13,835.000	6 cum	1½ Q.	Nov., 1907
Lackawanna Steel	30	.....	March 11	34,971 400	.....	.....	.....
Lake Sup. Corp	3⅝	— ⅜	Oct. 7	40,000 000	.....	.....	.....
New York Air Brake	58	— 1½	June 18	8.012 500	8	2 Q.	Oct., 1907
Niles Bement-Pond	130	.....	Feb. 5	8,500,000	6	1½ Q.	Dec., 1907
Niles Bement-Pond pr	120	.....		2.000,000	6 cum	1½ Q.	Feb., 1908
Otis Elevator Co	26	.....	March 16	6.156 600		1½ S. A.	Oct., 1907
Otis Elevator Co. pr,	78	.....		6,449 500	6 n. c.	1½ Q.	Oct., 1907
Penn. Steel	58	.....	May 11	10.750 000	.....	.....	.....
Penn. Steel pr	88	.....		18,500 000	7 n. c.	3½ S. A.	Nov., 1907
Pittsburg Coal Co	9	+1	Feb. 10	28 297.800	.....	.....	Nov., 1906
Pittsburg Coal pr	37	— ⅜		27,246.800	7 c.	3½	Apr., 1905
Pressed Stl. Car	20	+1¼	Feb. 19	12.500,000	3		Aug., 1904
Pressed Stl. Car pr	71	+⅞		12.500 000	7 n. c.	1¾ Q.	Feb. 1908
Pullman	150¼	.....	Nov. 11	100.000,000	8	2 Q.	Nov., 1907
Railway Stl. Spring	24	+ ¼	March 5	13.500,000	4	2 S. A.	Oct., 1907
Railway Stl. Spring pr	75¼	.....		13,500.000	7 cum	1¾ Q.	Dec., 1907
Rep. Iron & Steel	15¾	.....	Oct. 21	27.191,000	.....	.....	.....
Rep. Iron & Steel pr	65	—1¼		20.416 900	7 cum	1¾ Q.	Oct., 1907
Sloss-Sheffield	39⅝	—2⅜	March 11	10,000,000	5	1¼ Q.	Dec., 1907
Sloss-Sheffield pr	.....	.....		6 700,000	7 n. c.	1¾ Q.	Oct., 1907
U. S. Pipe & Fdy	18¾	— ½	June 24	12.500.000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy. pr	63¼	— ¾		12.500 000	7 n. c.	1¾ Q.	Dec., 1907
U. S. Steel	28⅝	— ⅛	April 20	508,302 500	2 n. c.	½ Q.	Dec., 1907
U. S. Steel pr	92	— ⅜		360.281.100	7 cum	1¾ Q.	Nov., 1907
U. S. Steel 5's	87⅞	— ⅛		463.798 000	5	5 A.	.....
Va. Iron, Coal & Coke	47	.....	Nov. 17	9,073,680	.....	.....	.....
Westinghouse Elec	41	+1	June 24	23 933,200*	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	102	.....	Oct. 6	11,000,000*		5 Q.	Jan., 1908

Par value of shares, $100, except those starred (*), $50.

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Columbia Brass Foundry, Freeport, N. Y., with a capital of $10,000, has these incorporators: Robert A. Patrick, George Christian and Mary Christian, Freepor , N. Y.

J. M. Jones, B. Richardson and Fred Abel, of Utica, N. Y., have incorporated the J. M. Jones Ladder Mfg. Co., to manufacture ladders, fire escapes, etc., with a capital of $4,000.

Kiser Air Condenser Co., Decatur, Ill., to manufacture machinery and devices for engines and boilers, has been incorporated by Lewis C. Kiser, Z. Donovan and James L. Fletcher, with a capital stock of $50,000.

The incorporation of the Monarch Foundry & Machine Co., Hillsboro, Tex., has been made by C. B. McConnell, E. B. Gutherie, J. V. Baker and R. P. Freeman, with a capital of $5,000.

The Mount Rock Foundry & Machine Co., Lewistown, Pa., with a capital of $25,000, has been incorporated by James B. Brown, Charles A. Reilly, Robert E. Bearley and Charles Z. Bearley, all of Lewistown.

The Vollrath Co., Sheboygan, Wis. has been organized by C. A. W. Vollrath, M. M. Reists and D. F. Reiss. The new company is capitalized at $10,000 and will engage in a foundry and enameling business.

The Model Typewriter Co., Phillipsburg, N. J., has been incorporated to manufacture typewriters. The capital stock is placed at $150,000, and the incorporators include G. H. Bruder, Williamsport, Pa., E. L. Wean and C. R. Slater, Phillipsburg, N. J.

The Titchener-Culver Iron Works, Oneonta, N. Y., for the manufacture of various metal articles, with a capital of $8,000, has these incorporators: Edmund H. Titchener and Frank L. Dennis of Binghamton, N. Y., and Curtis A. Culver of Oneonta, N. Y.

The compressed Air Power Co., Montgomery, Ala., to manufacture a stationary engine operated by compressed air, has been incorporated by H. C. Bushby, R. H. Bozeman and H. C. Talleson, with a capital of $200,000.

The Brunner Mfg. Co., Utica, N. Y., to manufacture compression pumps, tanks, etc., has been incorporated with a capital of $6,000. George Brunner, William B. Roemer, George A. Parker, Utica, N. Y., are among the incorporators.

Jonathan Bartley, Joseph Crossley and Lewis Lawton, of Trenton, N. J., have organized and incorporated the Jonathan Bartley Crucible Co., Trenton, N. J., to manufacture crucible melting pots and similar vessels. The new company will begin business with a capital of $125,000.

George W. Cummings Testing Laboratories, Boston, laboratories, has been incorporated with $50,000 capital stock. The officers are: President, George W. Cummings, Malden, Mass.; treasurer, Fred E. Crawford, Watertown, Mass.; clerk, George W. Cummings Jr., Malden, Mass.

The Marine Producer Gas Power Co., Manhattan, N. Y., has been incorporated with $100,000 capital by H. S. Graves, Rye, N. Y., R. M. Miles Jr., South Orange, N. J., and W. H. Peckham, New Rochelle. The company proposes to manufacture gas engines and auxiliary machinery.

The Kansas City Galvanizing & Mfg. Co., Kansas City, Mo., has been incorporated by E. E. Norquist, president; Edwin W. Miller, vice president and Thomas G. Gaines, general manager, to establish a plant for galvanizing metal under the electro-cold process, with a capital of $8,000.

The Berg Brick Machinery Co., Ltd., has been incorporated with a capital of $250,000 to manufacture machinery, having secured the plant of the Canadian Ship Building Co., at Toronto. The provisional directors are Anton Berg, John Berg, Severen Berg, Charles A. Moss and Joseph A. Thompson.

The Tell City Foundry & Machine Works Co., Tell City, Ind., foundry and machine shop to make castings and machinery as well as building boilers and engines, has been incorporated by Albert P. Fenn, R. P. Carr, Guy La Rue, Henry Boehrman and Adolph Zuelly with $10,000 capital.

Articles of incorporation have been filed by the Gilder Acme Horseshoe Co., Brooklyn, N. Y., to manufacture horseshoes, etc. The company is capitalized at $100,000, and the incorporators are Carl Munk, Greenpoint, N. Y.; Frank T. Clark, Sheepshead Bay; George Giller, 1164 Thirty-ninth street, Brooklyn, N. Y., and others.

New Construction:—

H. A. Seager, Monroe, Wash., has commenced work on a new foundry and machine shop at Monroe.

The Crescent Iron Works, of Los Angeles, Cal., is installing a boiler and tank plant at Fresno, Cal. F. W. Thompson will be the manager of the Fresno plant.

The Woburn Iron Foundry Co., Woburn, Mass., has made improvements in its foundry, installing a Newten cupola of 4 to 5 tons per hour capacity, furnished by the Northern Engineering Works, Detroit, Mich.

The Chicago, Lake Shore & Eastern railway has had plans prepared by its chief engineer, Arthur Montzheimer, Joliet, Ill., for a car repair shop to be built at Gary, Ind. It will be a one-story 94 x 300 feet brick and steel structure.

The Indiana Steel Co. has let the contract for the erection of a two-story brick and steel laboratory to be built at Gary, Ind. It will be 53 by 63 feet and will cost $35,000.

The Standard Bridge Co., Omaha, Neb., is having plans prepared for a one-story factory 60 by 100 feet, at Red Oak, Ia., to cost $25,000.

The Bunting Iron Works, Fresno, Cal., is installing two 800-horsepower boilers, employing a new firing method insuring perfect combustion. Two new pipe cutting machines are being added, as well as two lathes. The company finds these improvements necessary to keep pace with increasing business.

The National Steel Casting Co., Montpelier, Ind., at its annual meeting arranged for the purchase of an electric magnet of between five and six tons lifting power for handling old material. A new electrical generator will be installed in connection with the magnet and other improvements will be made in the spring.

The new Phoenix Foundry & Machine Co., Springfield, Mo., has drawn plans for a one-story pressed brick building, 50 x 87 feet, with an 18 x 18 cupola, at a cost of about $4,000. The machinery equipment on hand will probably be added to later in the year. The plant manufactures brass, malleable, iron, steel and gray iron castings.

The stockholders of the Campbell Mfg. Co., Gadsden, Ala., decided, at a recent meeting, to begin work on the building of a new plant, desiring early completion. The main building will be 100 x 250 feet. There will be a machine shop 40 x 180 feet, a ware room 50 x 100 feet, pattern shop, offices and other buildings. Robert Campbell, general manager, has been in the north purchasing the necessary machinery.

The A. Moresi Co., Ltd., Jeanerette,

La., has begun work on a new molding machine floor for its foundry. It will be 83 x 115 feet, supplied by three gray iron cupolas having a melting capacity of 40,000 pounds per hour and fitted with pneumatic hoists and traveling crane. Provision will also be made later to put in a 4-ton steel converter.

The Southwestern Iron Co., Guthrie, Okla., which recently increased its capital stock from $5,000 to $10,000, announces that this was for the purpose of taking care of rapidly increasing foundry business. The company is completing an addition to its foundry 80 x 160 feet and is adding a new 72-inch cupola. In addition to other work, the company is adding a line of steel ranges and cast iron stoves.

The Oil City Machine Co., Oil City, La., recently incorporated to do oil well machinery work and carry oil well supplies, has completed its first building, and part of the machinery has already been installed. Both shop and office will be located at Oil City, which is in the Caddo oil and gas fields, 23 miles from Shreveport, La., on the K. C. S. railway. It is the only shop of its kind in the field.

The Inventors' Protective Association of the Southwest recently formed at Dallas, Tex., with William A. Cathey of Houston, Tex., as secretary and treasurer, has decided to build a machine shop at Houston. The shop will be located on a piece of ground on the San Antonio & Aransas Pass railway, donated by G. P. A. Weisenborn, will be 60 x 125 feet and will cost $20,000. The shop will be for the manufacture of models and inventions of the members of the association.

Fires:—

The machine shop of Arthur Lenich, Baraboo, Wis., was damaged by fire Feb. 25. The loss, $5,000, was partly covered by insurance.

The Sioux City Iron Co., Sioux City, Ia., sustained serious damage to its stock in a fire Feb. 27. The store, valued at $80,000, was fully insured.

Trade Notes:—

The Union Steel Screen Works, Albion, Mich., is receiving a satisfactory amount of business, especially from the southern states, following a trip of Chris. Wiselogle. The company has enlarged its output capacity, and announces that it will have to make another addition to its plant in the spring.

The largest order for steel road scrapers ever received by the Kilbourne & Jacobs Mfg. Co., Columbus, O., was booked recently, the machines to be shipped to Warsaw, Poland. The company has received numerous orders for export within the last month, its export business showing an increase since last summer. A large number of western orders have also been received, and Colonel Kilbourne expresses himself as especially well pleased with the prospects.

The Bosworth, Dilley & Holding Co., Cleveland, dealer in machinery, has removed its offices from the Rockefeller building to room 656 Rose building.

The general offices of the International Steam Pump Co., with its constituents, will hereafter be located in the U. S. Realty building, 115 Broadway, N. Y., the work of removal from the Liberty street offices now being under way. The entire nineteenth floor will be occupied, and the New York office of the Power & Mining Machinery Co. and of Benjamin Guggenheim will be located in the same suite. The International company reports a healthy improvement in business. The Snow works are now operating full time and the foundry at Harrison is running five days a week.

The largest iron casting ever turned out in the state of Colorado was produced by the Colorado Gray Iron Foundry Co., Denver, Colo. It weighed 30,000 pounds and is part of a smelter equipment in Topeka, Kas. Five other castings of the same weight and six castings of 20,000 pounds have been contracted for by the same firm to be delivered by the Colorado foundry as fast as they can be finished. These contracts mark a new departure in iron working in Colorado, meaning that bids from the west will be considered in the future by firms desiring iron castings.

Electrical Topical Index.—The *Electric Journal,* Pittsburg, has issued a new four-year topical index, containing in convenient form, references to all of the important engineering articles which have appeared in the *Electric Journal* from its first issue up to date. By the use of the topical method of indexing, all articles on a given subject are classified together, so that in looking up any reference, not only the article desired, but also the articles which have appeared on the same subject in the various issues of the *Journal,* are presented.

Louis F. Fieser, of the pig iron firm of Fieser & Bentley, Columbus, O. sailed Feb. 29, for a three months visit to Europe.

General Industrial:—

Wilcox, Crittenden & Co., of Middletown, makers of marine hardware, have added $25,000 to their capital, bringing it up to $275,000.

O. H. Jones Co., Hartford, Conn., maker of plumbers' supplies, has increased its capital stock from $10,000 to $25,000.

A general assignment was made Feb. 21 by the Bridgeford Machine Tool Works, Rochester, N. Y., in favor of its creditors. No schedule of assets or liabilities was filed.

The new plant of the Northern Foundry & Machine Co., Sault Ste. Marie, Mich., including machine shop, foundry and pattern shop, has been completed and is now conducting business.

Michael Knowles and Benjamin Pues have established a machine shop and foundry at Paducah, Ky., under the firm name of Mechanics Foundry & Machine Shops. They have equipped a plant with the necessary machinery and have already booked several satisfactory contracts.

The Hendey Machine Co., Torrington, Conn., has increased its capital stock from $300,000 to $600,000. The company has recently expanded its plant. The Jennings Bros. Mfg. Co. of Bridgeport, maker of art metal goods, has increased its capital from $100,000 to $400,000.

The annual meeting of the National Carbon Co., at Trenton, N. J., Feb. 24, resulted in the re-election of the old board of directors, as well as the following officers: President, James Parmelee; vice president, Myron T. Herrick; vice president, Webb C. Hays; vice president and general manager, D. Dickey; treasurer, H. E. Heckenberg; treasurer, J. C. Crider.

The Pioneer Steel Co., Rockford, Ill., at its recent annual meeting re-elected J. B. Whitehead president, J. W. Kelchner, vice president and E. F. Derwent secretary and treasurer. Reports for the year indicated satisfactory returns, with excellent prospects for the new year, there being a continued demand for its product, soft center steel with extreme tool steel hardness.

The Kilbourne-Jacobs Co., Columbus, O., recently re-elected directors at its annual meeting, and the following officers: President and general manager, James Kilbourne; vice president, Felix A. Jacobs; vice president and assistant general manager, James R. Kilbourne; secretary, Fred W. Hubbard; treasurer, Frank C. Eaton; auditor, Joseph D. Potter, and purchasing agent, Lincoln Kilbourne.

Directors of the Longdale Iron Co., Philadelphia, were re-elected at the recent annual meeting.

An increase of capital stock to $400,000 from $300,000 has been made by the Canton Art Metal Co., Canton, O.

The Kansas City Bolt & Nut Works, Kansas City, Mo., has resumed work after two months' shut down with a force of 600 men.

The Ingersoll Milling Machine Co., Rockford, Ill., is shipping two large machines, each weighing 35 tons, to customers in Italy.

An increase of capital stock has been made by the Cleveland Wrought Washer Co., Cleveland, O., from $25,000 to $35,000.

The Shelby Mfg. Co., Canal Dover, O., is installing machinery and equipment shipped from Cleveland, where the plant was formerly located.

The Illinois Steel & Bridge Co., of Illinois, has established an agency in Oklahoma, in charge of Charles W. Crabtree, of Lawton, Okla., as agent.

The large plant of the Sheffield Casting & Mfg. Co., Sheffield, Ala., which shut down last fall, has resumed operations on a limited scale.

The Noelke Richards Iron Works Co., of Indianapolis, has taken out authorization papers to do business in Missouri, with an office in St. Louis.

The press report of an alleged fire at the Scott works of the Philadelphia Railway Steel Spring Co. was erroneous, the fire being confined to a building in the locality of the plant.

The Grey Iron Works, at Mount Joy, Pa., has been closed, throwing 100 hands out of employment, because the Willow & Wooden Ware Co., of which it was a branch, has gone into the hands of a receiver.

At the annual meeting of the stockholders of the Galena Iron Works Co., Galena, Ill., these directors were elected: R. Barrett, David Sheean, Henry Oldenburg, W. F. Sargent, C. C. Mathey, C. W. McIlhon and A. Weirich.

The principal creditors of the J. Thompson Mfg. Co., South Beloit, Ill., which recently failed for $200,000, have agreed to a settlement of 25 cents on the dollar. It is expected that the company will resume.

W. B. Potts, who for years has conducted a plumbing and machinery shop-store in Columbus, O., has removed to a new pressed brick four-story building at 80 South Front street. The entire building is devoted to the business.

The Warwick Iron & Steel Co., Philadelphia, re-elected these directors at its recent annual meeting: Edgar S. Cook, William H. Shelmerdine, William S. Pilling, Frederick W. Tunnell, F. H. Bachman, Phillip Doerr and G. E. Schlegelmilch.

Charles Millar & Son Co., Utica, N. Y., were successful bidders on proposals to furnish 400 tons of iron pipe to the city of Syracuse, N. Y. The bid price was $23.85 a ton, compared with $30 a ton paid by the city of Syracuse a year ago.

The Hagerstown Foundry Co., Hagerstown, Md., may move from that town, according to A. T. Benztmyer, proprietor, unless a suitable site for the industry is obtained. The building occupied by the foundry has been sold and will be torn down.

Involuntary bankruptcy proceedings were instituted in federal court at Huntsville, Ala., Feb. 21, by New Orleans banks against the Sheffield Rolling Mill Co., Sheffield, Ala. March 9 has been fixed by the court as the date for a hearing of the petition.

The Falk Co., Milwaukee, Wis., machinist and founder, has purchased 16 acres of ground in the Menominee valley. This gives the company a site of 50 acres in extent for its growing plant, the land being some of the highest priced manufacturing property in Milwaukee.

A large force of molders have been at work at the Lattimer Williams Mfg. Co.'s plant at Columbus, O., preparing the foundry for a general resumption. The company has been receiving orders and a large number of inquiries and expects to keep the plant in steady operation.

The increase of stock of the Portsmouth Stove & Range Co., Portsmouth, O., has been divided into $50,000 preferred and $150,000 common stock. The common stock has been taken up by the present stockholders. Much of the success of the Portsmouth company is attributed to the business acumen of Frank V. Knauss. The company made its first heat 18 years ago, and has grown steadily ever since.

The Fort Smith Well Drill Mfg. Co., Fort Smith, Ark., was recently incorporated and its capital increased for the purpose of taking care of a business established and carried on for the last three years. Announcement is made that the company has all the buildings necessary at present, but that possibly a lathe and power hammer will be added to its machinery equipment in the near future.

Frank P. Lannon, president of the Pueblo Foundry & Machine Co., has been in the east for the purpose of ordering machines and cupolas for the proposed steel casting plant at Pueblo, Colo. Plans for the construction of the buildings will be begun at once upon the return of Mr. Lannon. The plant will be the first of its kind for the manufacture of steel castings in that portion of the far west.

Contracts for mining work, as well as paper mill work, have been received at the plant of the Marinette Iron Mfg. Co., Marinette, Wis., so steadily that additional employes are being put to work. Orders for iron castings are especially noticeable and machine shop prospects are especially bright. Consignments of gasoline engines made during the winter for spring delivery are now being shipped.

The Edward Steam Specialty Co., Chicago, recently incorporated, is organized for the purpose of manufacturing the Edward valve and other steam specialties. The company expects to manufacture the valve on a large scale, but will not be able to decide for several months as to what building and what equipment will be required. At the present time, the company has rented shop and offices at 157-159 South Jefferson street, Chicago.

The Carlenwright Lamp & Brass Co., Inc., Reading, Pa., has leased the decorating plant of the National Brass Works, for the manufacture of decorated lamps and novelties. Operations have been commenced with a force of journeymen from Philadelphia, and the machinery is being placed in position. The Philadelphia quarters of the company were found to have grown too small because of its greatly increased business, and the removal to Reading became imperative.

A NEW USE FOR SULPHATE OF IRON.

The rapid accumulation of sulphate of iron or copperas in connection with the process of wire drawing in the wire mills has led to much experimenting with a view to finding profitable avenues for its disposal. As the largest producer the American Steel & Wire Co. has conducted many experiments and is just now calling the attention of growers of various farm crops to the value of a copperas solution as a spray. Elaborate experiments which are illustrated in a pamphlet just issued have been carried out by various agricultural experiment stations and the value of this material in eradicating weeds promises to afford an outlet to large quantities of this by-product. The advantage of this to the mill is much more than simply one of revenue and is in many respects similar to the slag disposal problem of the blast furnace.

TRADE PUBLICATIONS.

MINING DRILLS.—The February bulletin of the Sullivan Machinery Co. calls attention to the hammer drill it manufactures. The statements therein are very fair as borne out by experience with hammer drills particularly in the west. For up-holes in overhead work on stopes and raises the action of this type of drill is satisfactory as the drillings are removed naturally and in addition the portability of the drill and the small space in which it may be operated are distinct advantages. No set up is required and the feeding is either by hand or by automatic air feed communicated through a piston on which the drill is supported. The drill has shown itself to be more convenient also for trimming, cutting hitches and drilling holes in boulders for blasting than the ordinary reciprocating drill.

The hammer drill is exceedingly simple in its mechanical construction, has large power and high speed of drilling for its weight and size and is now designed to be an economical user of steel.

STEAM HEATING.—Warren Webster & Co., Camden, N. J. Fifth edition of Part V of the general catalog. 32 pages. 6 x 9 inches. A very neat and complete catalog descriptive of the Webster system of steam circulation for heating purposes, showing the possibilities of a system of steam circulation without pressure, the numerous installations of the system and its wide range of adaptability in the many and varied character of the buildings. Among the many advantages outlined in this catalog are—noiseless operation, economy of operation, simplicity, perfect control, etc.

STEAM SPECIALTIES.—The Strong, Carlisle & Hammond Co., Cleveland. Catalog No. 10. 43 pages. 6 x 9 inches. The Squires steam specialties described in this catalog are the result of practical experience in power station work, the advantages claimed by the manufacturer being ease of access to the working parts, simplicity of construction and positiveness and accuracy in operation. The Squires boiler feed-water regulator is described in detail, instructions being given as to installing, starting, stopping, etc., with price list; description showing operation, etc., and price list of the Squires water reducing and gas regulating valve; of the Squires class "H," excess and constant pressure pump governor, open feed-water heater controllers, regular and unlimited pressure steam traps, etc. A partial list of users of the Squires steam specialties is also contained in this booklet.

VALVES.—Jenkins Brothers, 71 John street, New York City, are issuing a supplement to their catalog, giving descriptions and price lists of their extra heavy and medium pressure gate valves. The heavy valves are suitable for extra high pressure and temperature steam and water service, and are especially adapted to meet the requirements of modern high pressure power plants, while the medium pressure valves are intended for medium heavy pressure steam and water service of all kinds.

PIPE.—The American Spiral Pipe Works, Chicago, is sending out a catalog calling attention, with numerous illustrations, to the many different uses for which Taylor's spiral riveted pipe is especially adapted, among which are its use for hydraulic mining and sluicing work in connection with giant nozzles, for distributing mains in packing houses, tanneries, paper mills, etc. There are several views of installations of this pipe, and the catalog also contains a list of users of this product for exhaust work, together with some testimonial letters from patrons.

REGULATORS.—The "S-C" Regulator Co., Fostoria, O., is distributing a folder entitled "The New Idea," relating to the "S-C" regulator, which is used as a protection for boilers. A description of its operation, construction and advantages, together with illustrations, are given.

ROTARY PUMPS.—The P. H. & F. M. Roots Co., Connersville, Ind. Catalog 35. 22 pages. The first pages of this booklet contain views of the home office and factory and interior views of the shops of the above company, while the following pages are devoted to detailed descriptions with numerous illustrations of the rotary pump recently perfected by it. The advantages claimed for this pump include simplicity, durability, efficiency and economy of power. The various parts described are the case, impellers (built-up type for which patent has been applied), shafts, bearings and gears. The pumps are belt-driven; motor-driven, with single reduction gearing mounted on the same bed plate, or with direct connection rigid coupling; engine or turbine driven, rigid coupling, or direct connection with flexible coupling. The latter pages of the catalog are devoted to engineering data for selecting pumps, including tables of sizes, speeds, driving power and water pressures.

CONVEYORS.—The Jeffrey Mfg. Co., Columbus, O. Catalog. 6 x 9 inches. 48 pages. This catalog deals with the Jeffrey "Century" rubber belt conveying machinery, the illustrations showing the application of rubber belt conveyors for handling materials of various kinds, including ore in South Africa, tailings at an African gold mine, crushed rock, ore to and from bins, sand, gravel, earth, etc. Some of these conveyors are installed in the Chicago postoffice and the Chicago tunnel for carrying mail. Price lists of the conveyors are also presented.

MINE CARS.—The Helmick Machine Co., Fairmont, W. Va., is issuing a small catalog illustrating and describing the various types of its cars most in demand; also their various parts.

ELECTRIC APPLIANCES.—The General Electric Co., Schenectady, N. Y., is distributing a series of bulletins dealing with its various electric appliances. Bulletin 4544 describes the present design of switchboards for railway use. These represent the result of continuous improvements in previous designs, and among the improved features claimed for them are simplicity of arrangement, facility of installation, reliability and safety in operation and long life. The bulletin covers several classes of panels, the following types being described: Generator panels, including circuit breakers and equalizer switch panels, rotary converter panels, and feeder panels. The various forms of apparatus used in connection with the panels, details of construction, etc., are described and illustrated and complete tables giving catalog numbers, capacities, etc., and dimension sketches are given. Bulletin No. 4558 describes a standard line of panels for small isolated plant work, where the conditions make it desirable to use a circuit breaker on the switchboard in place of the combined lever switch and fuse, which has been generally used in this type of panel in the past. The equipment of feeder panels and the combination generator and feeder panels are described, details of the instruments, circuit breakers, switches, mounting of rheostats, etc., are given, and dimensioned drawings, with diagrams of connections and tabulations of the various capacities are included. Bulletin 4563 describes and illustrates an improved type of switch indicator known as the SI-104, which has been recently perfected. Every possible precaution has been taken to insure reliable operation, the indicator being weather-proof, strong and neat in design.

ELECTRICAL FITTINGS.—The Electrocraft Publishing Co., Detroit, has published its October, 1907, edition of "Electrocraft's Illustrated List of Approved Electrical Fittings." This new edition brings the list of fittings that have been tested by the Underwriters' Laboratories, Inc., and approved by the Underwriters' National Electrical Association up to date and includes a new feature—the revised National Electrical Code—with drawings illustrating the application of many of its rules. This publication is in constant use not only by the electrical and underwriting field, but by many of the large manufacturing corporations of the country and by buyers and users of electrical fittings, as a reference book. A complete index of the Underwriters' rules is also included in this edition.

CORES.—The Cyclone Drill Co., Orrville, O. 82 pages. 6 x 9 inches. A very handsome and complete catalog containing a repousse bristol cover. The first pages of this catalog are devoted to a historical sketch relating to the gradual development of the various means of investigating mineral and coal lands up to the core drill. The following pages present information in regard to construction and methods of operation of the drills manufactured by the above company and give such data as will enable a prospective customer to select an outfit with just the right equipment for his work. Some of the special features of the drills are noted, their advantages detailed, and suggestions for selecting drilling outfits given. Tables of sizes, specifications, shipping weights, cutting speeds, etc., are also presented.

SHEARS.—The United Engineering & Foundry Co., Pittsburg. Large 73-page catalog, the first half of which presents information regarding lever shears. Among the different types mentioned are the motor-driven, belt-driven and engine-driven, capacities, weights, speeds, floor space, etc., of each type being given. Some of the users of lever and vertical shears are listed. The latter half of the catalog pertains to vertical shears and punches for work such as cutting and punching plates and bars. The belt-driven type, with and without feed rollers, the engine-driven type, especially designed to save floor space, the motor-driven type and numerous others are given; also the engine-driven punch with removable knife, vertical rail punch, vertical level punch, vertical lever shear, etc.

ELECTRIC METERS.—The Westinghouse Electric & Mfg. Co., Pittsburg. Circular No. 1104, entitled "Westinghouse Portable and Precision Meters." The devices described and listed in this circular represent the latest development in meter manufacture, designed and constructed with a view of securing accuracy and permanency. Detailed descriptions are given of the various forms and classes of precision and portable meters, with general information as to the proper selection, construction, principle of operation, etc., of each type. Capacities, connections, weights and dimensions, etc., are also presented.

CENTRIFUGAL AIR COMPRESSORS.—The General Electric Co., Schenectady, N. Y., in Bulletin 4564 describes its low pressure air compressors rated from 0.88 to four pounds per square inch and from capacities of 750 to 10,000 cubic feet of free air per minute. Compressor sets are furnished driven by Curtis steam turbine, direct-current motors and induction motors. Among the industrial applications are mentioned compressors used in foundry cupola service, for gas furnace service, where a constant pressure is maintained, and for exhauster service in sulphite pulp mills, chemical works, etc., where a small degree of vacuum is required; they can also be used for the ventilation of deep mine shafts, copper smelting industries, etc. Some of the principal advantages given in the bulletin are low maintenance and repair, high efficiency, and economy in operation and floor space.